MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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INTRODUCTION.

The present Summary, for the year 1897, is based essentially upon data received from about 150 regular Weather Bureau stations and 30 regular Canadian stations, all reporting daily by telegraph. A revised chart of total annual precipitation will be published in the Annual Report of the Chief of the Weather Bureau when the data from all voluntary stations have been received. The tables for thunderstorms and auroras are, as usual, based on reports from both voluntary and regular observers. The statistical tables have generally been prepared by the Division of Records and Meteorological Data, A. J. Henry, Chief.

GENERAL CLIMATIC CONDITIONS.

ATMOSPHERIC PRESSURE.

The mean annual pressure for 1897 is shown numerically in Tables I and II, both for the respective stations and as reduced to sea level by the method explained in the MONTHLY WEATHER REVIEW for 1894, Vol. XXII, p. 538. The corresponding isobars for sea level are shown on Chart I. As the international conferences of meteorologists have uniformly urged the application of the reduction to standard gravity and the further reduction to sea level by the tables and methods of the International Meteorological Committee, the Editor has requested Mr. Park Morrill, forecast official, to make the corresponding corrections and reductions, not only for sea level, but also for an upper level of 10,000 feet above the sea; these are given on Charts IV and V. The tables for passing from sea level upward to 10,000 feet are given on page 494 of the MONTHLY WEATHER REVIEW for 1895 or page 491 of the REVIEW for 1896. A general average decrement of temperature is assumed at the rate of 2° F. per 1,000 feet, or 0.37° C. per 100 meters, or about one-third of the adiabatic rate. Corresponding isobars for the level of 5,000 meters, or 16,404 feet, may be drawn by means of the table computed by Koeppen and published on page 419 of the MONTHLY WEATHER REVIEW for November, 1896.

The data on Chart I show that the highest pressures at sea level, not corrected for gravity, were 30.13 inches at Charleston, 30.12 at Knoxville, 30.11 at Chattanooga and Atlanta, respectively. The highest pressure for 1896 was 30.14 at Charleston. The lowest pressure for 1897 was 29.88, at Phœnix, as against 29.89, at the same station, in 1896.

The data on Chart IV show that the true pressure gradients at sea level differ appreciably from the apparent gradients shown on Chart I. The data on Chart V show that the high-level gradients are steeper, and that, therefore, the currents of air must be swifter than at sea level. As the atmosphere is a mixture of ascending and descending currents, which necessarily interact on each other, therefore, both the upper and lower gradients and winds and temperatures represent the result of the vertical interchange of air that is perpetually going on. The resultant surface winds, as also the upper currents, indicated by the clouds, are each related to both the upper and lower isobars.

AREAS OF HIGH AND LOW PRESSURE.

The average daily and hourly movements of the centers of these areas are given both by paths and by days in the individual tables of the successive MONTHLY WEATHER REVIEWS, and the monthly sums are collected together in the following table (A), which also gives the annual means by paths and by days.

These averages show the same peculiarities as those for previous years, namely, that the means taken by days are in all cases smaller than those taken by paths by about one-half of 1 per cent. This is apparently due to the fact that the numerous paths of rapid movements and short durations outweigh those of slow movement and long duration. If the movements of the centers depend upon the general movement of the upper portion of the atmosphere, as may be the case, then the general average movement of the atmosphere over the United States during 1897 was about the same as in 1896, as shown by the corresponding numbers, 550 and 549, or 606 and 612, respectively.

TABLE A.—*Movements of areas of high and low pressure for* 1897.

Month.	High areas.				Low areas.			
	By paths.		By days.		By paths.		By days.	
	No.	Movement.	No.	Movement.	No.	Movement.	No.	Movement.
		Miles.		*Miles.*		*Miles.*		*Miles.*
January	6	3,930	17.0	11,170	9	6,291	35.5	24,180
February	8	5,019	29.5	17,130	11	8,267	43.0	31,240
March	6	3,699	26.5	15,510	12	7,973	39.5	24,430
April	11	6,343	47.5	27,210	8	4,484	42.5	23,240
May	7	3,256	51.5	23,960	11	5,431	45.0	22,290
June	7	3,980	36.5	19,790	9	5,266	31.0	17,410
July	4	1,997	22.0	10,870	8	3,742	40.5	19,290
August	8	4,828	35.0	19,144	9	4,764	44.5	22,004
September	9	4,689	41.0	21,990	10	6,131	42.5	26,100
October	10	5,916	47.0	26,410	12	7,689	38.0	23,530
November	7	4,335	43.0	25,120	8	5,324	38.5	25,940
December	7	3,855	35.0	18,820	12	9,327	44.0	33,860
Sums	90	51,847	431.5	237,114	119	74,689	484.5	293,514
Mean daily velocity	576		550		628		606	
Mean hourly velocity	24.0		22.9		26.2		25.2	

As the corresponding table for 1896, on page 488 of the Summary and volume for that year, contained a clerical error the following is to be substituted for it:

Movement of areas of high and low pressures for 1896.

Month.	High areas.				Low areas.			
	By paths.		By days.		By paths.		By days.	
	No.	Movement.	No.	Movement.	No.	Movement.	No.	Movement.
		Miles.		*Miles.*		*Miles.*		*Miles.*
January	10	5,317	45.5	21,880	9	5,435	38.0	21,830
February	7	4,447	34.5	20,260	14	9,931	50.0	33,950
March	8	4,512	39.0	22,460	10	6,698	42.0	26,760
April	6	3,036	26.0	13,430	9	5,098	36.5	20,330
May	7	3,941	33.0	18,520	10	5,075	41.5	19,960
June	7	3,965	44.5	24,470	8	4,620	35.0	20,350
July	7	3,734	22.0	11,660	11	6,302	38.5	22,550
August	6	3,234	39.0	20,950	10	6,617	34.0	22,360
September	7	4,148	39.0	22,900	11	6,631	39.0	22,330
October	10	5,244	44.0	22,530	9	4,832	35.0	18,060
November	5	3,307	22.5	13,810	8	6,491	33.5	25,250
December	8	4,754	32.5	18,390	12	9,171	43.0	31,530
Sums	88	49,639	421.5	231,260	121	76,891	466.0	285,250
Mean daily velocity	564		549		635		612	
Mean hourly velocity	23.5		22.9		26.5		25.5	

TEMPERATURE.

The mean annual temperature at the surface of the ground is approximately shown by the isotherms on Chart I or by the individual figures given in Table I.

The lowest annual averages within the United States were: Williston, 38.8; Moorhead, 39.2; Bismarck and Duluth, 39.5 each.

The highest averages were: Key West, 77.2; Jupiter, 74.1; Tampa, 72.2; Corpus Christi, 70.7; Galveston, 70.2.

The mean annual temperature was above the normal at 101 stations, below at 20, and normal at 12.

The extreme temperatures of the year, or the absolute maxima and minima, are given in Table I and are shown by the isotherms on Chart II. The absolute range of temperature during the year is easily obtained by comparing the full and dotted lines on the same chart.

Maximum temperatures equaling or exceeding 105 occurred at Shreveport, Topeka, Abilene, Phœnix, Yuma, Walla Walla, Redbluff, Sacramento, and Fresno.

Minimum temperatures of —25 or lower occurred at Duluth, Moorhead, Bismarck, Williston, Minneapolis, St. Paul, Huron, and Havre.

The only portions of the country not visited by frost, assuming that frost does not occur with air temperatures above 32°, were the southern end of the peninsula of Florida and the coast line of southern California.

The large annual ranges of temperature were, as usual, in North Dakota and the Northern Slope, viz: Havre, 140°; Bismarck, 138°; Williston, 136; and Moorhead, 129°. The smallest annual ranges were: Key West, 40°; Eureka, 52°; and San Diego, 53°.

The accumulated departures of average monthly temperatures from the normal values are given in Table III. There has been a steadily accumulating deficiency in temperature throughout the Pacific Coast, middle, and southern Plateau regions, amounting to 8° at the end of the year; the northern Slope and North Dakota temperatures also diminished. In other regions there was a steady increase of positive departures, the maximum being in the Gulf and Lake regions.

MOISTURE.

The mean temperature of the dew-point and the mean relative humidity are given in Table I.

The mean temperature of the wet-bulb thermometer has been given for each month, and the average for the year can be easily inferred from Table I, as it is approximately midway between the temperature of the dew-point and the temperature of the air.

The total quantity of moisture in the atmosphere for the current year can be found by the table on pages 539–540 of the Annual Summary for 1894, and does not differ to any important extent from the figures there given for that year.

Evidently, the total rainfall during any year depends upon some other factor than the mere presence of moisture in the air; there is almost always enough moisture present but other conditions may be unfavorable.

PRECIPITATION.

The total fall of rain and melted snow for the calendar year, at regular Weather Bureau and Canadian stations, is presented on Chart III.

In 1894 precipitation was below average in every district east of the Rocky Mountains; in 1895 there was an excess of precipitation in the southern and middle Slopes, but elsewhere between the Rocky Mountains and the Atlantic seaboard there was a marked deficiency. In 1896 there was an excess of rainfall in the extreme Northwest, the upper Mississippi Valley, the Missouri Valley, and the northern and southern Slopes. The year 1897 opened with heavy rains in the lower Mississippi Valley, Tennessee, Alabama, and adjoining regions, and it seemed as if the period of diminished rainfall had come to a close. The rainfall of May was about average, except in the Gulf States, Arkansas, Missouri, and upper Mississippi valleys. The June rainfall was generally below the average, but in July unusually heavy rains fell throughout New England, the upper Lake Region, upper Mississippi Valley, Florida, and portions of the Ohio Valley and the Middle and South Atlantic States. By the middle of August a drought had set in over practically all of the territory east of the Rocky Mountains, which was not broken in some localities until about the 1st of November, and the year ended as one of generally deficient rainfall.

The stations having the largest deficiencies during 1897 are: Galveston, Tex., 19.44 inches; New Orleans, La., 17.05 inches; Raleigh, N. C., 16.94 inches; Wilmington, N. C., 16.66 inches. The stations having the largest excesses are: Jupiter, Fla., 29.09 inches; Fort Canby, Wash., 12.88 inches; New Haven, Conn., 9.98 inches.

The fall of snow for the so-called snow year, namely, from July 1 to June 30, inclusive, is given in the Annual Report of the Chief of the Weather Bureau.

The accumulated departures of the total monthly precipitation from the normal values are shown in Table IV, from which it appears that the total annual precipitation was normal in one district, above the normal in 6, and below in the remaining 14. As in previous years, the greatest deficiency exists in the west Gulf States and lower Mississippi Valley. Precipitation has been below normal in this region since 1890. The deficit during 1897 has been steadily increasing in the Middle and South Atlantic regions, east and west Gulf, upper and lower Lake, Missouri, and upper Mississippi valleys, but a notable excess has accumulated in the Florida Peninsula.

WIND.

The prevailing direction of the wind, namely, that which occurred most frequently at 8 a. m. and 8 p. m., seventy-fifth meridian time, is given in Table I. The annual resultant wind deduced from all the 8 a. m. and 8 p. m. observations of direction, without taking into account the velocity of the wind, is given in Table V; this computation is equivalent to

attributing a uniform average velocity to all winds. These resultants are also presented graphically on Chart I, but should be studied in connection with both the lower isobars of Charts I and IV and the upper isobars of Chart V. The relation between the resultant winds thus computed from two observations per day, without regard to velocities and those computed from twenty-four hourly observations, taking full account of the velocities, can be estimated by a comparison between Tables V and VI, pages 544 and 545 of the Summary for 1894.

FREQUENCY OF THUNDERSTORMS.

The successive MONTHLY WEATHER REVIEWS have given for each day and each State the number of thunderstorms reported by both voluntary and regular observers; Tables VI and VII give the annual summary of these monthly tables. In order to ascertain the relative frequency of thunderstorms for the whole country exhaustively, it would be necessary to have at least one special thunderstorm observer for every 20 miles in distance, or every 400 square miles of area. The corresponding number for the respective States is given in the third column of the accompanying Table B. In the absence of such a system of stations, it is proper to divide the number of storms reported by the number of reporting stations in order to deduce the average number per station per annum. The results of this division are given in the eighth column of Table B, which shows that the greatest frequencies per station per annum were: South Carolina, 24.9; Florida, 24.3; Missouri and Tennessee, 22.6; North Carolina, 21.0. The smallest frequencies were: California, 2.6; Washington, 3.9; Oregon, 4.2.

The product of the observed number of thunderstorms by the reduction factors given in column 5 will give the approximate total number of thunderstorms for the whole area of each State.

There were no very severe tornadoes during the year, the one causing the destruction of a portion of the town of Chandler, Okla., on March 30, being the most notable. The year as a whole was remarkably free from violent local storms.

FREQUENCY OF AURORAS.

Tables VIII and IX give a summary of the detailed tables of auroral frequency in the respective MONTHLY WEATHER REVIEWS. The annual numbers are also collected in Table B. In the absence of more precise knowledge it is assumed that the number of observers reporting all auroras is the same as that of those reporting all thunderstorms, and is as given by the estimates published in the fourth column of Table B; the number is, of course, decidedly less than the number of those who report rainfall and temperature.

The total number of auroras reported divided by the number of observing stations for any State gives the relative frequency per station, as shown in the 9th column of Table B, which number is comparable with similar ratios for other parts of the world, provided that the aurora is so low down in the atmosphere as not to be obscured by a cloudy sky. On the other hand, if the auroral light emanates from a region far above the clouds, then a further correction for cloudiness is needed. The average annual cloudiness at 8 p. m., seventy-fifth meridian time, is given in the tenth column of Table B, for regular Weather Bureau stations, but a correction for cloudiness has not been applied in the present case, as the Editor believes that we have no certain proof of the extreme altitude of the aurora, while there are many reasons for believing that the light emanates from the cloud region itself.

The States that reported the greatest frequency of auroras per station were: New Hampshire, 5.93; Maine, 5.67; North Dakota, 5.62; Vermont, 3.91; Montana, 3.00.

TABLE B.—*Frequency of thunderstorms and auroras during* 1897.

State.	Areas in units of 10,000 sq. miles.	Number of stations.		Reduction factor.	Total for 1897.		Frequency per station.		Annual average cloudiness at 8 p. m., approximate.
		Needed.	Reporting.		Thunderstorms.	Auroras.	Thunderstorms.	Auroras.	
Alabama	5.1	128	45	2.8	415	0	9.2	0.00	43
Arizona	11.4	285	30	9.5	320	1	10.7	0.03	35
Arkansas	5.2	130	45	2.9	672	0	14.9	0.00	42
California	15.8	395	115	3.4	298	2	2.6	0.02	35
Colorado	10.4	260	65	4.0	917	8	14.1	0.12	50
Connecticut	0.5	12	15*	0.8	224	13	14.9	0.87	45
Delaware	0.2	5	4	1.2	64	6	16.0	1.50	48
District of Columbia	0.01	0.2	2	0.5	31	0	15.5	0.00	47
Florida	5.9	148	40	4.7	972	0	24.3	0.00	44
Georgia	5.8	145	45	3.2	454	0	10.1	0.00	42
Idaho	8.6	215	30	7.2	290	8	9.7	0.27	60
Illinois	5.5	138	80	1.7	1,378	64	17.2	0.80	52
Indiana	3.4	85	45	1.9	600	7	13.3	0.16	50
Indian Territory	3.1	78	5	15.6	63	0	12.6	0.00	35
Iowa	5.5	138	90	1.5	913	44	10.1	0.49	46
Kansas	8.1	202	65	3.1	748	28	11.5	0.43	38
Kentucky	3.8	95	40	2.4	604	0	15.1	0.00	50
Louisiana	4.1	102	45	2.3	860	0	19.1	0.00	41
Maine	3.5	88	15	5.9	101	85	6.8	5.67	55
Maryland	1.1	28	30	0.9	528	12	17.6	0.40	48
Massachusetts	0.8	20	20*	1.0	253	43	12.6	2.15	51
Michigan	5.6	140	80	1.8	729	103	9.1	1.29	57
Minnesota	8.4	210	60	3.5	699	101	11.6	1.68	52
Mississippi	4.7	118	40	2.8	578	1	14.4	0.25	42
Missouri	6.5	162	80	2.0	1,812	12	22.6	0.15	44
Montana	14.4	360	35	10.3	193	105	5.5	3.00	50
Nebraska	7.6	190	90	2.1	713	28	7.9	0.31	44
Nevada	11.2	280	35	8.0	296	17	8.5	0.49	45
New Hampshire	0.9	22	15*	1.5	174	89	11.6	5.93	55
New Jersey	0.8	20	45	0.4	770	14	17.1	0.31	48
New Mexico	12.1	302	30	10.1	286	0	9.5	0.00	43
New York	4.7	118	70	1.7	717	86	10.2	1.23	55
North Carolina	5.1	128	50	2.2	1,050	0	21.0	0.00	45
North Dakota	7.5	185	40	4.6	245	225	6.1	5.62	47
Ohio	4.0	100	125	0.8	1,680	79	13.4	0.63	55
Oklahoma	3.9	98	20	4.9	161	6	8.0	0.30	40
Oregon	9.5	238	45	5.3	190	4	4.2	0.09	57
Pennsylvania	4.6	115	70	1.6	961	19	13.7	0.27	52
Rhode Island	0.1	2	5	0.4	33	2	6.6	0.40	42
South Carolina	3.4	85	30	2.8	748	1	24.9	0.03	41
South Dakota	7.6	190	45	4.2	296	67	6.6	1.49	52
Tennessee	4.6	115	40	2.9	904	3	22.6	0.08	41
Texas	27.4	685	70	9.1	568	0	8.1	0.00	42
Utah	8.4	210	30	7.0	296	1	9.9	0.03	55
Vermont	1.0	25	12	2.1	178	47	14.8	3.91	58
Virginia	6.1	152	35	4.3	489	0	14.0	0.00	46
Washington	7.0	175	45	3.9	175	36	3.9	0.80	60
West Virginia	2.3	58	30	1.9	317	1	10.6	0.03	50
Wisconsin	5.3	132	55	2.4	617	105	11.2	1.91	54
Wyoming	9.8	245	15	16.4	141	5	9.4	0.33	52

*The values for Connecticut, New Hampshire, and Massachusetts reduced from last year on account of discontinuance of the publication of a number of reports from those States.

SUNSHINE AND CLEAR SKY.

The successive MONTHLY WEATHER REVIEWS have presented in Table XI the percentages of sunshine as recorded by either photographic or thermometric self-registers, as also in Table I, the personal observations and estimates of the average cloudiness from sunrise to sunset. The corresponding chapters in the text have called attention to the systematic differences between the instrumental and the personal records. These differences are doubtless in part due to instrumental and personal peculiarities, such as arise in every kind of exact work; but in addition to these we must consider the fact that the photographic and thermometric registers give the *duration* of certain limiting values of actinic and thermal effects respectively, whereas the personal observations give the percentage of *area* of clear sky. There is no simple relation between these three kinds of data and instead of combining the records indiscriminately we should first investigate the reasons for these differences.

The differences (instrumental minus personal), as given in detail in the tables published from month to month, are collected together in the accompanying Tables C and D for the photographic and thermometric stations, respectively. A cursory examination of these tables shows that there is an annual periodicity by reason of which the differences are larger in the summer than in the winter months. Inasmuch as the average percentage of clear sky is also larger in summer,

this amounts to saying that for the same percentage of clear sky there is also nearly the same percentage of hours during which the limiting thermal or actinic effect prevails. Again, the differences are larger for certain stations at which clear sky largely prevails, so that in the geographical distribution of sunshine the differences follow the same law as in the annual distribution. As regards latitude, both the instrumental and the photographic stations show smaller differences in extreme northern and southern latitudes and larger differences in the medium latitude of 30° to 40°. But this variation with latitude does not appear so plainly in previous years, and it is more proper to study the mean annual differences by climatic groups after plotting them upon the chart representing the mean annual cloudiness for 1897.

TABLE C.—*Instrumental records minus personal estimates at photographic stations.*

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual mean.
Galveston	− 3	+ 5	0	+ 8	+ 6	+11	+ 9	+ 8	+ 6	+ 1	+ 5	+ 2	4.8
Savannah	− 5	− 1	+ 4	+ 8	+ 9	+25	+22	+10	+ 4	+ 6	+ 8	+ 5	7.9
San Diego	+ 9	+13	+11	+ 1	0	− 3	− 6	− 8	− 8	+ 1	+ 2	+ 9	1.8
Phœnix	+ 6	+ 7	+ 6	+ 6	+11	+10	+ 8	+ 7	+16	+10	+15	+13	9.6
Los Angeles	+ 8	+ 7	+13	+11	+ 5	+15	+10	+11	+13	+ 6	+ 7	+ 6	9.3
Santa Fe	+ 9	+14	+12	+11	+ 8	+11	+ 9	+14	+14	+ 6	+11	+ 9	10.7
Dodge City	+ 7	+ 4	+ 1	+ 9	+ 5	+12	+11	+10	+13	+ 7	+ 8	+ 7	7.8
Washington	+ 4	+ 5	+ 9	+ 7	+ 5	+12	+12	+17	+ 6	+ 3	+ 6	− 1	7.1
Kansas City	+ 4	+ 4	0	+ 8	+ 2	+ 9	+ 9	+ 4	+ 4	+ 7	+ 1	+ 6	4.8
Atlantic City	+ 6	+ 7	+ 9	+13	+13	+10	+17	+12	+13	+ 7	+15	+10	11.0
Denver	+11	+ 9	+21	+18	+29	+26	+20	+19	+22	+15	+19	+13	18.5
Salt Lake City	+19	+15	+26	+17	+37	+31	+20	+29	.....	+19	+ 5	− 2	.....
Eureka	− 1	+ 1	+ 7	+ 9	+ 6	+ 3	− 3	−12	− 2	+ 3	0	+ 4	1.2
Cheyenne	+16	+13	+ 9	+ 8	+22	+ 7	+10	.....	.....	+11	+ 9	+ 8	.....
Omaha	+ 4	+11	+10	+ 9	+10	+19	+11	+15	+ 8	+ 9	.....	+ 1	.....
Northfield	+ 6	+13	+11	+11	+11	+18	+13	+12	+ 7	+ 8	+ 7	+ 1	9.8
Eastport	+15	+ 8	+ 7	+ 8	+ 8	+15	+17	+13	+21	+14	+11	+ 7	12.0
St. Paul, Minn.	0	0	+ 1	+ 7	+12	+11	+15	+14	+11	+ 6	+ 3	− 2	6.5
Portland, Oreg	− 7	− 8	− 7	+ 5	+ 3	− 4	0	+ 9	− 7	− 9	− 3	− 3	− 2.6
Helena	0	+ 2	+ 5	+ 4	+ 6	+ 6	+10	+ 7	+ 2	+ 5	+ 4	− 1	4.2
Bismarck	+ 7	+10	+ 6	+ 4	+ 6	+12	+ 2	+ 2	+ 5	+ 6	+10	+ 3	6.1
Spokane	−11	+ 3	.....	.....	+11	.....	.....	.....	.....	.....	.....	.....	.....

TABLE D.—*Instrumental records minus personal estimates. Thermometric stations.*

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual mean.
Key West	.....	.....	.....	.....	+20	+20	+27	+30	+26	+11	+12	+15	.....
Tampa	+ 3	+ 5	+ 5	+ 4	+ 2	+ 7	+ 3	+ 5	+ 2	+ 3	+ 3	+ 1	3.6
New Orleans	+ 2	0	0	0	− 1	− 1	+ 1	− 1	− 1	− 1	− 1	0	−0.2
Jacksonville	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+15	+10	.....
Vicksburg	+ 1	+ 2	0	+ 3	+13	+22	+23	+ 9	+ 4	+ 6	+ 1	+ 2	7.2
Charleston	+ 3	0	.....	+ 9	+10	+17	+14	+ 6	+ 4	+ 1	+ 2	− 2	.....
Atlanta	+ 1	− 2	+ 4	+ 5	+11	+ 3	+10	+ 4	+ 4	− 2	− 1	+ 5	3.4
Wilmington	+ 4	+ 4	+ 4	+ 7	+10	+12	+10	+ 4	.....	+ 3	+ 7	+ 3	.....
Little Rock	+12	+16	+11	+21	+24	+32	+26	+20	+17	+15	+19	+12	18.8
Chattanooga	+ 1	− 4	− 5	+ 7	+ 4	+ 6	+ 7	+ 5	+10	+ 1	+ 4	− 1	2.9
Oklahoma	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+ 4	.....
Raleigh	+ 8	+13	+12	+19	+17	+17	+36	+24	+14	+ 8	+11	+ 1	15.0
Knoxville	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+ 3	+ 5	.....
Nashville	+ 6	+ 6	+12	+ 6	+ 5	+ 6	+14	+13	+ 5	+ 4	+ 3	+ 6	7.2
Fresno	− 3	+ 8	− 3	+ 5	+ 5	+ 1	+ 3	+ 6	+ 6	+ 4	+15	+ 5	4.3
San Francisco	+13	+ 8	+ 8	+11	+13	+19	+ 4	+ 6	+ 8	+14	+15	+16	11.2
Louisville	+ 8	+10	+15	+15	+22	+25	+24	+18	+ 9	+ 7	+14	+ 7	14.5
St. Louis	+13	+18	+14	+14	+15	+27	+21	+17	+ 4	+11	+ 6	+10	14.2
Cincinnati	+ 1	+ 2	+ 9	+ 5	+ 8	+20	+14	+ 5	+ 2	+ 3	+ 1	+ 6	6.3
Parkersburg	.....	.....	.....	.....	.....	.....	.....	+15	+ 9	+ 2	0	+ 2	.....
Baltimore	− 7	+ 7	+ 7	− 1	+10	+ 4	− 3	− 5	− 3	+ 6	+ 7	+12	2.8
Indianapolis	+19	+16	+15	+11	+ 9	+ 9	+22	+16	+ 9	+10	+ 9	+ 3	12.3
Philadelphia	+10	+22	+18	+21	+27	+15	+23	+16	+15	+11	+11	+16	17.1
Columbus	.....	+ 9	+ 3	.....	+10	+24	+24	+19	+14	+11	− 1	−16	.....
Harrisburg	.....	.....	.....	.....	+30	+28	+22	+22	+12	+14	+18	+14	.....
Pittsburg	− 6	+ 4	.....	+ 5	+ 2	+ 4	+ 4	− 5	− 7	− 1	+ 5	0	.....
New York	+ 9	+19	+11	+18	+20	+19	+13	+16	+ 3	+ 6	+16	+ 8	13.2
Cleveland	+ 1	+ 2	+ 4	+ 6	+ 1	+ 9	+ 8	+ 7	+ 9	+ 9	+ 4	0	5.0
Des Moines	+ 1	+ 3	+ 3	+ 3	+ 5	+ 6	+ 2	+ 2	+ 3	+ 1	0	+ 3	2.7
Chicago	+ 1	+ 2	+ 4	+ 3	+ 5	+ 5	0	− 1	0	+ 1	+ 1	− 1	1.7
Erie	.....	.....	+17	+ 6	+ 7	+ 5	+14	+21	+13	+ 8	+11	− 7	.....
Binghamton	+ 1	+ 5	+ 1	+ 6	+ 8	+ 8	+15	+15	+ 6	+ 8	+ 8	+ 4	7.1
Detroit	+ 7	+10	+11	+ 8	+12	+11	+14	+13	+ 6	+ 6	+ 4	− 1	8.4
Boston	+ 7	+ 5	+ 5	+ 7	+ 8	+13	+13	+11	+ 9	+ 8	+ 8	+10	8.7
Dubuque	− 4	− 7	− 1	− 5	− 3	+ 1	+ 4	+ 2	.....	− 3	− 3	0	.....
Albany	+ 7	+23	+19	.....	+11	+21	+27	+23	+19	+24	+13	+ 7	.....
Buffalo	+ 2	+11	.....	+29	+17	+21	+31	+18	+11	+19	+11	+10	.....
Yankton	.....	.....	.....	.....	.....	.....	.....	.....	.....	+ 9	+10	+ 6	.....
Rochester	+ 6	+ 3	+ 2	+ 3	+ 2	+ 5	+ 5	+ 3	+ 2	+ 1	+ 1	+ 2	2.9
Idaho Falls	.....	+26	+ 1	− 8	− 3	+ 6	+ 3	+ 2	+ 2	0	+ 3	.....	.....
Portland, Me	+ 7	+16	+15	+14	+20	+12	+14	+11	+17	+12	+ 8	+ 2	12.3
Huron	.....	.....	.....	.....	.....	.....	.....	.....	.....	+ 3	+ 2	+ 5	.....
Portland, Oreg	− 5	− 4	− 4	+ 1	+ 3	+ 3	+ 3	+11	− 6	+ 2	+ 8	0	1.0
Tacoma	.....	.....	.....	.....	.....	.....	.....	.....	.....	+16	+ 6	0	.....
Seattle	− 5	+ 4	+10	0	+17	+14	+ 5	+ 8	− 4	−15	− 8	−14	1.1
Spokane	.....	.....	.....	.....	.....	.....	+23	+24	+ 6	+10	+ 2	− 3	.....

REDUCTION OF TEMPERATURE AND PRESSURE.

By PARK MORRILL, Forecast Official.

The following Table E gives the original data and the resulting mean annual temperatures and pressures reduced to sea level in accordance with the principles explained in the Summary for 1895, Vol. XXIII, page 492. The temperatures are first reduced to sea level, by applying the general rule of an increase of 2° F. for 1,000 feet of descent, plus a station correction determined from a discussion of normal data. These sea-level temperatures are charted and a system of smooth isotherms is drawn, as shown on Chart IV.

The column temperatures used in computing the reduction of pressure to sea level are given in column 7 and are obtained from the sea-level temperatures by subtracting one-half of the reduction given by the general rule of 2° per 1,000 feet.

The temperatures at the 10,000-foot level are 20° F. less than those at sea level, therefore, the isotherms of Chart IV become the isotherms of Chart V by subtracting 20°.

The pressures in the fourth column are the so-called mean annual apparent station pressures given in Table I, plus a reduction to standard gravity. In the last column of Table E are given the pressures computed from the preceding data for the altitude of 10,000 feet by the same process that was used for reducing to sea level and by the help of the small table printed on page 494 of the Summary for 1895.

The reduced pressures, both for sea level and for the upper level are shown on Charts IV and V, respectively.

For further details see the Summaries for 1895 and 1896.

TABLE E.—*Reduction data for* 1897.

Station.	Elevation.	Latitude.	Mean observed pressure.	Mean observed temperature.	Mean dew-point.	Mean reduction temperature.	Mean pressure reduced to sea level.	Mean temperature reduced to sea level.	Mean pressure at 10,000 feet altitude.
1	2	3	4	5	6	7	8	9	10
New England.	*Feet.*	° ′	*Inches.*	° *F.*	° *F.*	° *F.*	*Inches.*	° *F.*	*Ins.*
Eastport, Me	76	44 54	29.92	41.5	35	41.6	30.00	41.7	20.52
Portland, Me	103	43 39	29.89	45.1	37	45.2	30.00	45.3	20.57
Northfield, Vt	872	44 10	29.09	41.4	34	42.3	30.05	43.2	20.57
Boston, Mass	125	42 21	29.89	49.9	40	50.0	30.03	50.1	20.67
Nantucket, Mass	14	41 17	30.03	49.6	44	49.6	30.04	49.6	20.67
Block Island, R. I	27	41 10	30.02	49.5	43	49.5	30.05	49.5	20.68
New Haven, Conn	107	41 18	29.92	49.9	40	50.0	30.04	50.1	20.68
Middle Atlantic States.									
Albany, N. Y	97	42 39	29.95	48.8	40	48.9	30.06	49.0	20.68
New York, N. Y	314	40 43	29.71	51.6	42	51.9	30.06	52.2	20.72
Harrisburg, Pa	377	40 16	29.67	52.3	40	52.7	30.08	53.1	20.76
Philadelphia, Pa	117	39 57	29.94	54.6	44	54.7	30.06	54.8	20.77
Baltimore, Md	123	39 18	29.92	55.2	43	55.3	30.06	55.4	20.78
Washington, D. C	112	38 54	29.95	54.9	45	55.0	30.08	55.1	20.79
Lynchburg, Va	685	37 25	29.34	57.3	45	58.0	30.07	58.7	20.84
Norfolk, Va	57	36 51	30.02	60.1	51	60.2	30.08	60.3	20.87
South Atlantic States.									
Charlotte, N. C	773	35 13	29.24	60.4	48	61.2	30.06	62.0	20.89
Hatteras, N. C	11	35 15	30.06	62.2	56	62.2	30.07	62.2	20.89
Raleigh, N. C	375	35 45	29.68	60.7	49	61.1	30.09	61.5	20.90
Wilmington, N. C	78	34 14	29.99	63.7	55	63.8	30.08	63.9	20.93
Charleston, S. C	48	32 47	30.05	67.1	57	67.2	30.10	67.3	21.00
Augusta, Ga	180	33 28	29.87	64.8	54	65.0	30.06	65.2	20.94
Savannah, Ga	82	32 05	29.99	67.5	58	67.6	30.07	67.7	20.97
Jacksonville, Fla	43	30 30	30.01	70.2	62	70.2	30.06	70.2	20.98
Florida Peninsula.									
Jupiter, Fla	28	26 57	30.00	74.1	66	74.1	30.03	74.1	21.06
Key West, Fla	22	24 34	30.01	77.2	68	77.2	30.03	77.2	21.10
Tampa, Fla	36	27 57	30.02	72.2	63	72.2	30.05	72.2	21.04

TABLE E.—*Reduction data for* 1897—Continued.

Stations.	Elevation.	Latitude.	Mean observed pressure.	Mean observed temperature.	Mean dew-point.	Mean reduction temperature.	Mean pressure reduced to sea level.	Mean temperature reduced to sea level.	Mean pressure at 10,000 feet altitude.
1	2	3	4	5	6	7	8	9	10
East Gulf States.	*Feet.*	° ′	*Inches.*	° *F.*	° *F.*	° *F.*	*Inches.*	° *F.*	*Ins.*
Atlanta, Ga	1,131	33 45	28.89	61.8	50	62.9	30.08	64.0	20.93
Pensacola, Fla	56	30 25	29.99	68.6	60	68.7	30.05	68.8	20.99
Mobile, Ala	57	30 41	30.00	67.7	59	67.8	30.06	67.9	20.98
Montgomery, Ala	221	32 23	29.82	66.5	55	66.7	30.05	66.9	20.96
Vicksburg, Miss	254	32 22	29.76	66.7	54	67.0	30.03	67.3	20.95
New Orleans, La	54	29 58	29.98	70.2	60	70.3	30.04	70.4	21.01
West Gulf States.									
Shreveport, La	249	32 30	29.76	67.0	53	67.2	30.02	67.4	20.94
Fort Smith, Ark	481	35 22	29.50	62.0	50	62.5	30.01	63.0	20.86
Little Rock, Ark	302	34 45	29.72	63.1	49	63.4	30.04	63.7	20.90
Corpus Christi, Tex	20	27 49	29.98	70.7	64	70.7	30.00	70.7	20.98
Galveston, Tex	42	29 18	29.99	70.2	63	70.2	30.03	70.2	20.99
Palestine, Tex	310	31 45	29.48	67.0	54	67.5	30.01	68.0	20.95
San Antonio, Tex	704	29 27	29.26	69.5	54	70.2	29.99	70.9	20.98
Ohio Val. and Tennessee.									
Chattanooga, Tenn	702	35 04	29.27	61.0	48	61.8	30.08	62.6	20.91
Knoxville, Tenn	1,004	35 56	29.04	59.1	48	60.1	30.07	61.1	20.88
Memphis, Tenn	399	35 09	29.62	62.8	49	63.2	30.05	63.6	20.93
Nashville, Tenn	545	36 10	29.48	60.4	46	60.9	30.06	61.4	20.88
Lexington, Ky	989	38 02	28.99	55.7	43	56.7	30.04	57.7	20.81
Louisville, Ky	525	38 15	29.49	57.7	44	58.2	30.05	58.7	20.83
Indianapolis, Ind	823	39 46	29.17	53.0	42	53.8	30.06	54.6	20.77
Cincinnati, Ohio	628	39 06	29.38	55.3	43	55.9	30.06	56.5	20.80
Columbus, Ohio	824	39 58	29.16	52.9	43	53.7	30.05	54.5	20.76
Pittsburg, Pa	842	40 32	29.17	53.3	44	54.1	30.07	54.9	20.78
Parkersburg, W. Va	638	39 16	29.39	54.6	44	55.2	30.08	55.8	20.80
Lower Lake Region.									
Buffalo, N. Y	768	42 53	29.19	48.0	38	48.7	30.03	49.4	20.66
Oswego, N. Y	335	43 29	29.66	46.4	38	46.7	30.02	47.0	20.62
Rochester, N. Y	523	43 08	29.45	48.0	38	48.5	30.03	49.0	20.66
Erie, Pa	714	42 07	29.27	48.6	41	49.3	30.05	50.0	20.69
Cleveland, Ohio	762	41 30	29.21	49.5	40	50.2	30.04	50.9	20.69
Sandusky, Ohio	629	41 25	29.36	50.5	40	51.1	30.04	51.7	20.71
Toledo, Ohio	674	41 40	29.31	49.6	40	50.3	30.04	51.0	20.72
Detroit, Mich	730	42 20	29.25	48.4	40	49.1	30.05	49.8	20.69
Upper Lake Region.									
Alpena, Mich	609	45 05	29.35	43.2	37	43.8	30.03	44.4	20.58
Grand Haven Mich	628	43 05	29.33	47.0	39	47.6	30.02	48.2	20.63
Marquette, Mich	734	46 34	29.19	41.6	35	42.3	30.00	43.0	20.53
Port Huron, Mich	639	43 00	29.35	46.8	39	47.4	30.05	48.0	20.65
Sault Ste. Marie, Mich	624	46 28	29.32	39.7	33	40.3	30.01	40.9	20.51
Chicago, Ill	824	41 52	29.15	48.8	40	49.6	30.04	50.4	20.69
Milwaukee, Wis	671	43 02	29.31	46.8	38	47.5	30.05	48.2	20.65
Greenbay, Wis	617	44 31	29.37	44.7	35	45.3	30.05	45.9	20.62
Duluth, Minn	702	46 48	29.24	39.5	32	40.2	30.02	40.9	20.51
North Dakota.									
Moorhead, Minn	935	46 52	28.99	39.2	32	40.1	30.02	41.0	20.53
Bismarck, N. Dak	1,674	46 47	28.22	39.5	27	40.9	30.04	42.6	20.56
Williston, N. Dak	1,875	48 09	27.98	38.8	26	39.8	30.02	41.7	20.53
Upper Mississippi Valley.									
St. Paul, Minn	837	44 58	29.11	43.7	34	44.5	30.02	45.4	20.59
Davenport, Iowa	599	41 30	29.37	50.3	38	50.9	30.02	51.5	20.69
Des Moines, Iowa	867	41 35	29.11	49.6	38	50.5	30.05	51.4	20.71
Keokuk, Iowa	614	40 22	29.38	52.6	41	53.2	30.04	53.8	20.74
Cairo, Ill	359	37 00	29.65	59.2	48	59.6	30.04	60.0	20.83
Springfield, Ill	644	39 48	29.34	52.9	41	53.5	30.04	54.1	20.74
St. Louis, Mo	567	38 38	29.44	57.4	45	58.0	30.05	58.6	20.83
Missouri Valley.									
Kansas City, Mo		39 05	29.01	55.4	42	56.4	30.04	57.4	20.80
Springfield, Mo	1,324	37 12	28.62	56.7	44	58.0	30.01	59.3	20.81
Omaha, Nebr	1,103	41 16	28.84	50.9	40	52.0	30.02	53.1	20.72
Pierre, S. Dak	1,460	44 24	28.42	45.8	34	45.9	30.00	47.4	20.64
Huron, S. Dak	1,306	44 21	28.60	42.2	32	44.8	30.02	46.1	20.61
Northern Slope.									
Havre, Mont	2,494	48 34	27.32	40.0	27	41.9	29.98	44.4	20.54
Helena, Mont	4,108	46 34	25.84	43.3	26	47.3	30.06	51.4	20.71
Rapid City, S. Dak	3,251	44 04	26.59	46.5	29	47.5	29.99	50.8	20.69
Cheyenne, Wyo	6,105	41 08	23.99	44.5	24	49.8	30.01	55.9	20.76

TABLE E.—*Reduction data for* 1897—Continued.

Stations.	Elevation.	Latitude.	Mean observed pressure.	Mean observed temperature.	Mean dew-point.	Mean reduction temperature.	Mean pressure reduced to sea level.	Mean temperature reduced to sea level.	Mean pressure at 10,000 feet altitude.
1	2	3	4	5	6	7	8	9	10
Northern Slope—Cont'd.	*Feet.*	° ′	*Inches.*	° *F.*	° *F.*	° *F.*	*Inches.*	° *F.*	*Ins*
Lander, Wyo	5,372	42 50	24.63	42.6	24	47.6	30.01	53.0	20.70
North, Platte, Nebr	2,826	41 08	27.08	49.6	37	52.3	30.01	55.1	20.75
Middle Slope.									
Denver, Colo	5,290	39 45	24.71	49.4	28	52.6	29.97	57.9	20.75
Pueblo, Colo	4,713	38 18	25.25	51.5	37	54.8	29.96	59.5	20.77
Concordia, Kans	1,598	39 35	28.51	54.0	41	55.9	29.99	57.3	20.76
Dodge City, Kans	2,504	37 45	27.38	54.8	40	57.6	29.96	60.1	20.78
Wichita, Kans	1,351	37 41	28.58	57.2	42	58.9	30.00	60.3	20.81
Oklahoma, Okla	1,218	35 26	28.72	59.4	47	60.3	30.00	61.5	20.83
Southern Slope.									
Abilene, Tex	1,749	32 23	28.20	63.8	47	64.6	30.00	66.3	20.91
Amarillo, Tex	3,691	35 13	26.25	55.1	38	58.5	29.98	62.2	20.83
Southern Plateau.									
El Paso, Tex	3,767	31 47	26.15	63.1	32	65.3	29.90	69.1	20.89
Santa Fe, N. Mex	6,998	35 41	23.26	48.2	27	55.5	29.97	62.5	20.82
Middle Plateau.									
Carson City, N. Mex	4,720	39 08	25.26	48.6	27	53.3	29.99	58.0	20.84
Salt Lake City, Utah	4,344	40 46	25.65	50.2	34	54.2	30.03	58.5	20.81
Northern Plateau.									
Baker City, Oreg	3,470	44 50	26.44	45.7	29	52.3	30.01	55.8	20.76
Idaho Falls, Idaho	4,742	43 29	25.24	43.3	29	47.8	30.05	52.5	20.73
Spokane, Wash	1,943	47 40	27.96	48.1	34	49.6	30.03	51.5	20.69
Walla Walla, Wash	1,018	46 02	28.95	53.1	39	51.5	30.05	52.5	20.73
North Pacific Coast.									
Fort Canby, Wash	179	46 16	29.83	50.4	46	50.6	30.03	50.8	20.68
Seattle, Wash	119	47 38	29.91	51.5	43	51.6	30.04	51.7	20.71
Tatoosh Island, Wash	86	48 23	29.94	48.1	43	48.2	30.03	48.3	20.64
Portland, Oreg	153	45 32	29.88	53.1	43	53.3	30.05	53.5	20.74
Roseburg, Oreg	521	43 13	29.48	53.5	43	54.0	30.04	54.5	20.75
Middle Pacific Coast.									
Eureka, Cal	64	40 48	30.02	51.6	46	53.8	30.09	53.9	20.78
Red Bluff, Cal	334	40 10	29.65	62.0	40	55.8	30.01	56.1	20.76
San Francisco, Cal	155	37 48	29.87	55.1	47	55.3	30.04	55.5	20.77
South Pacific Coast.									
Fresno, Cal	332	36 43	29.61	62.3	42	60.1	29.96	60.4	20.79
Los Angeles, Cal	330	34 03	29.61	61.8	49	61.8	29.96	62.1	20.81
San Diego, Cal	87	32 43	29.87	61.0	50	63.5	29.96	63.6	20.84
San Luis Obispo, Cal	201	35 18	29.80	58.3	45	58.5	30.01	58.7	20.80
Canadian stations.									
St. Johns, N. F.	125	47 34	29.71	39.9	....	40.0	29.94	40.1	20.48
Sydney, C. B. I.	55	46 10	29.92	41.6	....	41.7	29.98	41.8	20.51
Halifax, N. S.	118	44 39	29.90	43.0	....	43.1	30.03	43.2	20.55
Grand Manan, N. B.	49	44 47	29.94	42.4	....	42.4	29.99	42.4	20.52
Yarmouth, N. S.	65	43 50	29.94	43.2	....	43.3	30.01	43.4	20.55
Charlottetown, P. E. I.	38	46 14	29.93	41.0	....	41.0	29.97	41.0	20.48
Chatham, N. B.	21	47 08	29.96	38.4	....	38.4	29.98	38.4	20.45
Father Point, Que.	20	48 31	29.95	34.6	....	34.6	29.97	34.6	20.38
Quebec, Que.	296	46 48	29.66	38.0	....	38.3	29.99	38.6	20.46
Montreal, Que.	187	45 30	29.79	41.4	....	41.6	30.00	41.8	20.50
Rockliffe, Ont	472	46 12	29.48	37.3	....	37.8	30.01	38.3	20.46
Kingston, Ont	285	44 13	29.70	43.6	....	43.9	30.01	44.2	20.56
Toronto, Ont	350	43 39	29.65	44.9	....	45.3	30.03	45.6	20.60
White River, Ont	1,252	48 20	28.67	31.6	....	34.0	30.06	35.3	20.45
Port Stanley, Ont	592	42 40	29.39	44.8	....	45.4	30.05	46.0	20.62
Saugeen, Ont	656	44 30	29.30	42.9	....	43.6	30.02	44.3	20.57
Parry Sound, Ont	635	49 15	29.31	40.6	....	41.2	30.01	41.8	20.53
Port Arthur, Ont	644	48 27	29.29	35.4	....	36.0	30.01	36.0	20.43
Winnipeg, Man	760	49 53	29.15	33.3	....	34.1	30.00	34.9	20.40
Minnedosa, Man	690	50 10	28.17	32.2	....	34.7	30.03	37.4	20.46
Qu'Appelle, Assin	2,115	50 44	27.69	32.8	....	35.1	29.99	37.2	20.43
Medicine Hat, Assin	2,161	50 01	27.65	38.4	....	40.0	29.98	42.2	20.51
Swift Current, Assin	2,439	50 20	27.39	36.1	....	37.8	30.02	40.2	20.50
Calgary, Alberta	3,389	51 02	26.39	35.5	....	38.9	29.96	42.3	20.48
Prince Albert, Sask	1,402	53 55	28.41	34.8	....	37.1	29.95	38.5	20.49
Edmonton, Alberta	2,158	53 14	27.63	34.8	....	37.9	29.96	40.1	20.46
Battleford, Sask	1,620	52 41	28.24	32.6	....	34.4	30.02	36.0	20.43
Prospect, Ber	151	32 23	29.94	70.2	....	70.4	30.10	70.6	21.05
Esquimalt, B. C	28	48 26	29.99	47.3	....	47.3	30.02	47.3	20.62

RIVER AND FLOOD SERVICE.

By PARK MORRILL, Forecast Official, in charge of River and Flood Service.

TABLE F.—*Annual summary of river stages for* 1897.

Stations.	Highest water.		Lowest water.		Mean stage.	Annual range.
	Stage.	Date.	Stage.	Date.		
Mississippi River.	*Feet.*		*Feet.*		*Feet.*	*Feet.*
St. Paul, Minn	18.0	Apr. 6	2.3	Nov. 27		15.7
Redwing, Minn	13.7	Apr. 7–9	2.3	Nov. 23–30		11.4
La Crosse, Wis	13.7	Apr. 10	2.3	Nov. 28		11.4
North McGregor, Iowa	17.6	Apr. 13, 14	1.5	Nov. 28		16.1
Dubuque, Iowa	17.9	Apr. 15	0.2	Nov. 30		17.7
Leclaire, Iowa	11.9	Apr. 17, 18	0.2	Nov. 30		11.7
Davenport, Iowa	15.1	Apr. 18	−0.5	Dec. 1		15.6
Muscatine, Iowa	15.1	Apr. 18–20	0.9	Dec. 2, 3		14.2
Keokuk, Iowa	18.5	Apr. 27	−2.0	Dec. 6	5.3	20.5
Hannibal, Mo	20.0	Apr. 29	−1.4	Dec. 6	6.2	21.4
Grafton, Ill	23.2	May 2	0.1	Dec. 9, 10	8.8	23.1
St. Louis, Mo	31.0	May 2	−0.4	Dec. 24	12.4	31.4
Chester, Ill	26.8	Apr. 12	−1.9	Dec. 24, 25	9.6	28.7
Cairo, Ill	51.6	Mar. 26	2.5	Oct. 29–29	21.3	49.1
Memphis, Tenn	37.1	Mar. 19–21	0.2	Oct. 30	14.9	36.9
Helena, Ark	51.8	Apr. 4	−0.8	Oct. 26–29	20.4	52.6
Arkansas City, Ark	51.9	Mar. 29	−2.3	Oct. 27–Nov. 1	21.2	54.2
Greenville, Miss	46.7	Mar. 29	−1.2	Oct. 30	18.3	47.9
Vicksburg, Miss	52.3	Apr. 16	−3.4	Nov. 5–12	21.2	55.7
New Orleans, La	19.5	May 13	2.3	Dec. 5, 6	8.7	17.2
Arkansas River.						
Fort Smith, Ark	18.6	Jan. 5	0.6	Oct. 27–31 Dec. 7–9	5.1	18.0
Dardanelle, Ark	18.4	Mar. 20	−0.7	Oct. 29–Nov. 3	4.3	19.1
Little Rock, Ark	21.4	Mar. 21	1.0	Oct. 26–31	6.5	20.4
White River.						
Newport, Ark	27.9	Jan. 7 Mar. 22	0.1	Oct. 11–17	7.3	27.8
Illinois River.						
Peoria, Ill	18.3	Mar. 23–27	3.7	Sept. 29–Oct. 15	8.0	14.6
Missouri River.						
Bismarck, N. Dak	22.2	Apr. 6	1.7	Oct. 9–13 Nov. 17		20.5
Pierre, S. Dak	12.1	Apr. 15	−1.1	Nov. 27		13.2
Sioux City, Iowa	16.4	Apr. 15	4.1	Nov. 25		12.3
Omaha, Nebr	17.2	Apr. 15	4.7	Oct. 6–15, 26–30		13.5
St. Joseph, Mo	13.2	Apr. 18	−2.7	Dec. 6–8		15.9
Kansas City, Mo	22.8	Apr. 19	2.0	Dec. 7, 8	10.1	20.8
Boonville, Mo	20.0	Apr. 29	0.9	Dec. 20	8.8	19.1
Hermann, Mo	15.8	Apr. 30 May 1	−3.6	Dec. 22	5.3	19.4
Ohio River.						
Pittsburg, Pa	28.9	Feb. 24	1.7	June 3, 4, 7	6.2	27.2
Davis Island Dam, Pa	26.6	Feb. 24	1.2	Oct. 12	6.2	25.4
Wheeling, W. Va	38.7	Feb. 24	0.4	Oct. 28–31	7.9	38.3
Parkersburg, W. Va	37.9	Feb. 25	0.9	Oct. 25, 27–31 Nov. 1	9.5	37.0
Point Pleasant, W. Va	52.3	Feb. 25	0.8	Sept. 23–29	10.7	51.5
Catlettsburg, Ky	58.5	Feb. 25	0.9	Sept. 29–Oct. 2	13.8	57.6
Portsmouth, Ohio	59.0	Feb. 25	1.7	Oct. 24	14.9	57.3
Cincinnati, Ohio	61.1	Feb. 26	3.0	Oct. 26	17.6	58.1
Louisville, Ky	35.4	Feb. 28	2.4	Sept. 22–25	8.4	33.4
Evansville, Ind	43.6	Mar. 2, 3	0.4	Oct. 6	14.4	43.2
Paducah, Ky	50.9	Mar. 24, 25	−0.3	Oct. 8–11	15.1	51.2
Alleghany River.						
Warren, Pa	8.6	Mar. 11	0.0	Oct. 1–31	1.5	8.6
Oil City, Pa	10.4	Mar. 11	0.0	Oct. 17–Nov. 1	2.3	10.4
Parkers Landing, Pa	12.7	Mar. 7	−0.4	Oct. 30–Nov. 1	2.7	13.1
Freeport, Pa	20.7	Mar. 6	0.4	Oct. 19–Nov. 1	4.9	20.3
Conemaugh River.						
Johnstown, Pa	10.5	Feb. 23	0.4	Oct. 26–30	2.0	10.1
Red Bank Creek.						
Brookville, Pa	4.8	Mar. 6	−1.1	June 2–17	0.5	5.9
Beaver River.						
Ellwood Junction, Pa	15.3	Feb. 9	−1.3	Oct. 28–Nov. 2	1.3	16.6
Cumberland River.						
Burnside, Ky	58.1	Apr. 5	−1.0	Oct. 11	5.8	59.1
Carthage, Tenn	46.1	Mar. 16	0.0	Oct. 30, 31	7.8	46.1
Nashville, Tenn	48.7	Mar. 21	0.0	Oct. 25–27, 30, 31	10.3	48.7
Great Kanawha River.						
Charleston, W. Va	41.5	Feb. 23	3.0	Feb. 1	6.7	38.5
New River.						
Hinton, W. Va	12.9	Feb. 24	0.8	Sept. 20–24 Oct. 7–12	2.5	12.1
Licking River.						
Falmouth, Ky	27.8	Feb. 23	0.0	Oct. 17–20	3.7	27.8
Miami River.						
Dayton, Ohio	16.3	Mar. 6	0.5	Oct. 8–11	2.2	15.8
Monongahela River.						
Weston, W. Va	15.2	Feb. 23	−2.5	Oct. 18–Nov. 8		17.7
Fairmont, W. Va	27.8	Feb. 23	−0.7	[a]	2.1	28.5
Greensboro, Pa	33.5	Feb. 23	4.3	Oct. 27, 28, 30, 31	8.5	29.2
Lock No. 4, Pa	36.0	Feb. 23, 24	4.4	Nov. 7, 8	9.0	31.6
Cheat River.						
Rowlesburg, W. Va	13.5	Feb. 23	−1.2	Oct. 25	3.0	14.7
Youghiogheny River.						
Confluence, Pa	13.6	Feb. 23	−0.1	Sept. 14–23 Oct. 30–31	2.0	13.7
West Newton, Pa	22.0	Feb. 23	−0.2	Oct. 22–31	1.9	22.2
Tennessee River.						
Knoxville, Tenn	26.0	Feb. 24	−0.3	Oct. 14–19		26.3
Kingston, Tenn	27.0	Feb. 24	0.0	[b]		27.0
Chattanooga, Tenn	38.2	Mar. 14	0.4	Oct. 8–10	6.7	37.8
Bridgeport, Ala	27.2	Mar. 16	−0.2	Oct. 9–13	4.8	27.4
Lower Muscle Shoals, Ala	17.7	Mar. 19	0.1	Oct. 9	2.7	17.6
Florence, Ala	32.5	Mar. 19	−0.5	Oct. 11	5.9	33.0
Riverton, Ala	50.3	Mar. 20	−2.0	Oct. 8–11	7.0	52.3
Johnsonville, Tenn	48.0	Mar. 24	−0.3	Oct. 6–20	8.7	48.3

TABLE F.—*Annual summary of river stages*—Continued.

Stations.	Highest water.		Lowest water.		Mean stage.	Annual range.
	Stage.	Date.	Stage.	Date.		
Clinch River.	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Speers Ferry, Va	21.9	Feb. 22	−0.8	Oct. 10, 15–17		22.7
Wabash River.						
Mount Carmel, Ill	26.4	Mar. 13	0.5	Oct. 21–Nov. 1	6.7	25.9
Red River.						
Arthur City, Tex	21.4	Mar. 30	2.1	[c]	5.6	19.3
Fulton, Ark	28.6	Mar. 23	1.0	Nov. 24–Dec. 10	7.5	27.6
Shreveport, La	24.1	Apr. 13, 14	−2.1	Dec. 5–10	5.5	26.2
Alexandria, La	26.3	Apr. 15, 16	−3.1	Nov. 24–28	6.9	29.4
Atchafalaya Bayou.						
Melville, La	36.1	May 15	1.3	Nov. 19	19.1	34.8
Ouachita River.						
Camden, Ark	38.7	Mar. 23	2.4	Oct. 19–30	7.1	36.3
Monroe, La	37.9	Apr. 9–12	0.0	Sept. 24–Oct. 31	15.9	37.9
Yazoo River.						
Yazoo City, Miss	31.5	Apr. 27–May 2	2.6	Sept. 25, 29, 30	9.7	28.9
Chattahoochee River.						
Columbus, Ga	28.6	Mar. 14	1.5	Oct. 10–16		27.1
Flint River.						
Albany, Ga	31.6	Mar. 25	0.8	Oct. 12, 28		30.8
Cape Fear River.						
Fayetteville, N. C	37.6	Mar. 16, 17	0.2	Oct. 8, 9	7.4	37.4
Columbia River.						
Umatilla, Oreg	25.0	May 23	1.5	Nov. 12		23.5
The Dalles, Oreg	42.7	May 24	2.4	Nov. 5		40.3
Cascade Locks, Oreg	40.9	May 23	7.6	Nov. 9		33.3
Willamette River.						
Albany, Oreg	18.4	Feb. 4	1.0	Oct. 1–19	5.3	17.4
Portland, Oreg	23.7	May 24, 25	0.4	Oct. 21, Nov. 3	9.2	23.3
Edisto River.						
Edisto, S. C	6.6	Aug. 26	1.4	June 2–5	3.7	5.2
James River.						
Lynchburg, Va	13.6	Feb. 24	−0.2	[d]	1.2	13.8
Richmond, Va	15.0	Feb. 24	−0.5	Aug. 21–24	0.8	15.5
Alabama River.						
Montgomery Ala	38.0	Mar. 16	−1.5	Oct. 6–16	5.2	39.5
Selma, Ala	41.5	Mar. 26	−2.0	Sept. 28–Oct. 19	6.6	43.5
Coosa River.						
Lock No. 4, Ala	17.9	Mar. 20	−0.2	Oct. 8–10	3.8	18.1
Wetumpka, Ala	39.0	Mar. 16	−0.6	Oct. 10, 11, 13	6.7	39.6
Etowah River.						
Canton, Ga	11.2	Apr. 5	−0.7	Oct. 1–3	0.7	11.9
Tombigbee River.						
Columbus, Miss	31.9	Mar. 23	−3.7	Oct. 28–30 Nov. 24–28	1.6	35.6
Demopolis, Ala	54.8	Mar. 29	−2.6	Oct. 13–31	8.7	57.4
Black Warrior River.						
Tuscaloosa, Ala	54.8	Mar. 8	−1.9	Oct. 9–21	7.5	56.7
Pedee River.						
Cheraw, S. C	31.4	Feb. 8	0.3	Oct. 12	5.6	31.1
Smiths Mills, S. C	17.4	Mar. 23	−0.6	Sept. 16–18	6.7	18.0
Lumber River.						
Fairbluff, N. C	6.6	Mar. 1–3	−0.8	Oct. 11–13	2.5	7.4
Lynch Creek.						
Effingham, S. C	14.0	Feb. 14	2.1	Oct. 7–13	5.7	11.9
Potomac River.						
Harpers Ferry, W. Va	23.6	Feb. 24	0.0	Sept. 7–19 Oct. 4–24	2.4	23.6
Roanoke River.						
Clarksville, Va	12.8	Feb. 25	−0.4	Sept. 13–17, 21		13.4
Sacramento River.						
Redbluff, Cal	21.6	Feb. 6	0.0	[e]	3.3	21.6
Sacramento, Cal	24.2	Feb. 9, 10	8.3	Sept. 25–Oct. 3	14.6	15.9
Santee River.						
St. Stephens, S. C	13.7	Feb. 15	−1.4	Sept. 18–22	4.9	15.1
Congaree River.						
Columbia, S. C	20.7	Feb. 7	0.8	Jan. 8–13	2.5	19.9
Wateree River.						
Camden, S. C	29.7	Feb. 8	1.6	Oct. 10	8.8	28.1
Savannah River.						
Augusta, Ga	27.1	Feb. 7	3.9	Oct. 11	9.0	23.2
Susquehanna River.						
Towanda, Pa	11.3	Mar. 25	0.3	Sept. 14–22 Oct. 7–31		11.0
Harrisburg, Pa	11.5	Mar. 26	0.5	[f]	3.3	11.0
Brush Creek.						
Irwin, Pa	3.3	Feb. 23	0.0	[g]	0.6	3.3
Juniata River.						
Huntingdon, Pa	8.7	Feb. 23	2.8	[h]	3.7	5.9
Mifflin, Pa	13.0	Feb. 23	1.5	[k]		11.5
W. Br. of Susquehanna.						
Karthaus, Pa	6.0	Feb. 24	0.1	Sept. 11–21	2.0	5.9
Driftwood, Pa	5.6	Mar. 24	1.2	[i]	2.5	4.4
Keating, Pa	7.7	Mar. 25	0.4	Oct. 26–Nov. 1	2.2	7.3
Renovo, Pa	8.5	Mar. 7	−0.5	Sept. 16 Oct. 21, 22	2.2	9.0
Lockhaven, Pa	6.5	Feb. 23	0.0	[m]	1.3	6.5
Williamsport, Pa	11.3	Mar. 25	0.0	Sept. 11, 12	3.0	11.3
Waccamaw River.						
Conway, S. C	7.3	Mar. 7, 8	0.2	Nov. 19–22	2.7	7.1

[a] Sept. 13–20; Oct. 11 to Nov. 9. [b] Sept. 11 to Oct. 19; Oct. 26 to Nov. 3; Nov. 5 to Dec. 3. [c] Nov. 18–20, 27–30; Dec. 1–3, 14–18. [d] Sept. 1–22, 27–30; Oct. 1–11; Nov. 19–28. [e] Aug. 28–31; Sept. 18 to Oct. 1; Oct. 10, 11. [f] Jan. 26, Sept. 15, Oct. 21. [g] Aug. 19; Sept. 9–18; Oct. 13–20; Nov. 1. [h] July 10–18; Aug. 29 to Sept. 23; Sept. 30 to Oct. 25; Oct. 28 to Nov. 1. [k] Aug. 29 to Sept. 17; Sept. 20–24, 27–30; Oct. 1–13, 16–21, 24–31; Nov. 1, 2. [i] June 24 to July 10; Oct. 9 to Nov. 1. [m] Sept. 10–19, 23; Oct. 5 to Nov. 1; Nov. 8–10.

TABLE I.—*Annual meteorological summary, Weather Bureau Stations, 1897.*

Districts and stations.	Elevation of barometer above sea level.	Pressure in inches.†			Temperature of the air in degrees, Fahrenheit.							Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation.			Winds.				Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall, in inches.‡
		Mean actual, 8 a. m., +8 p. m. ÷2.	Mean reduced.	Departure from normal.	Mean max. +min. ÷2.	Departure from normal.	Maximum.	Mean maximum.	Minimum.	Mean minimum.	Annual range.			Total, in inches.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Max. velocity. Miles, per hour.	Max. velocity. Direction.					
New England.																									
Eastport, Me	76	29.92	30.01	+.05	41.5	0.0	89	48	−14	35	103	35	80	39.57	− 5.61	165	97,343	nw.	66	e.	96	95	174	6.5	71.5
Portland, Me	103	29.89	29.99	+.01	45.1	−0.6	94	53	− 8	38	102	37	76	42.42	+ 0.16	134	64,463	nw.	40	se.	119	103	143	5.7	75.6
Northfield, Vt	872	29.09	30.05	+.04	41.4	+0.2	95	52	−18	31	113	34	79	39.14	+ 3.40	143	73,730	s.	50	nw.	66	146	153	6.5	83.6
Boston, Mass	125	29.90	30.04	+.04	49.9	+1.3	94	58	2	42	92	40	73	40.77	+ 4.19	121	99,734	sw.	48	s.	133	70	162	5.6	43.2
Nantucket, Mass	14	30.04	30.05	+.02	49.6	+0.8	82	55	10	45	72	44	84	33.73	− 7.00	139	104,337	sw.	49	ne.	117	81	167	6.3	26.5
Woods Hole, Mass	.....	.....	.....	.....	49.0	+0.2	85	54	6	44	79	.....	.....	41.95	− 2.66	112	132,776	s.	60	sw.	172	81	112	4.5	31.1
Vineyard Haven, Mass	.....	.....	.....	.....	51.8	+0.5	88	59	9	45	79	.....	.....	46.74	+ 5.22	119	84,747	sw.	.....	.....	145	92	128	....	33.5
Block Island, R. I	27	30.03	30.06	−.03	49.5	+0.4	86	54	9	45	77	43	80	52.19	+ 8.00	126	138,089	sw.	70	ne.	109	162	94	5.2	37.9
Narragansett Pier, R. I	.....	.....	.....	.....	49.0	+0.5	90	57	3	41	87	.....	.....	51.47	+ 3.97	110	.....	s.	.....	.....	193	39	133	.....	37.5
New Haven, Conn	107	29.93	30.05	+.01	49.9	+0.5	93	58	5	42	88	40	73	57.89	+ 9.98	126	82,085	n.	56	e.	144	69	152	5.3	67.4
Middle Atlantic States.																									
Albany, N. Y	97	29.96	30.07	+.05	48.8	+0.6	96	58	− 5	40	101	40	77	40.79	+ 2.93	144	69,296	s.	42	se.	109	118	138	5.9	28.9
Binghamton, N. Y	875	.....	.....	.....	47.1	.....	95	57	− 6	38	101	.....	.....	27.09	.....	147	58,575	nw.	43	s.	96	127	142	6.1	39.3
New York, N. Y	314	29.72	30.06	+.01	51.6	−0.1	91	58	5	45	86	42	74	44.27	− 0.53	135	115,267	nw.	60	nw.	130	108	127	5.4	39.1
Harrisburg, Pa	377	29.68	30.10	+.03	52.3	+0.8	95	60	4	44	91	40	68	33.66	−10.40	123	64,913	w.	48	w.	106	106	153	5.9	23.9
Philadelphia, Pa	117	29.95	30.07	+.01	54.6	+1.2	96	62	7	47	89	44	71	42.04	+ 2.20	133	88,787	nw.	46	ne.	105	124	136	5.7	25.7
Atlantic City, N. J	52	30.02	30.08	+.03	52.7	+0.8	94	59	6	46	88	47	82	35.65	− 7.06	127	100,406	sw.	53	ne.	125	146	94	5.1	24.4
Baltimore, Md	123	29.94	30.07	.00	55.2	0.0	97	63	8	47	89	43	68	47.49	+ 3.64	141	45,224	w.	30	n.	126	122	117	5.2	11.6
Washington, D. C	112	29.97	30.09	+.01	54.9	+0.2	97	64	8	46	89	45	74	44.58	+ 1.12	137	59,549	s.	47	nw.	159	90	116	4.7	16.2
Cape Henry, Va	.....	.....	.....	.....	59.5	+0.9	96	66	11	53	85	.....	.....	37.97	−14.37	113	113,360	se.	.....	.....	116	100	149	.....	11.2
Lynchburg, Va	685	29.36	30.10	+.02	57.3	+0.4	99	68	8	47	91	45	70	40.08	− 2.77	123	37,008	nw.	34	nw.	147	113	105	4.9	9.2
Norfolk, Va	57	30.04	30.10	+.03	60.1	+1.1	96	68	11	52	85	51	79	42.66	− 9.42	135	71,930	ne.	46	nw.	154	84	127	5.0	12.5
South Atlantic States.																									
Charlotte, N. C	773	29.27	30.09	+.01	60.4	+0.5	98	70	6	51	92	48	71	42.39	− 9.59	131	57,541	ne.	36	sw.	155	100	110	5.0	12.1
Hatteras, N. C	11	30.09	30.10	+.03	62.2	+0.8	89	67	18	58	71	56	83	58.82	− 7.59	129	112,430	ne.	56	n.	136	126	103	5.1	T.
Raleigh, N. C	375	29.71	30.11	+.01	60.7	+1.6	98	70	9	51	89	49	70	38.57	−16.94	129	54,946	sw.	32	nw.	128	128	109	5.2	9.3
Wilmington, N. C	78	30.02	30.11	+.03	63.7	+0.7	97	72	14	55	83	55	79	37.68	−16.66	121	70,972	s.	44	sw.	160	120	85	4.5	T.
Charleston, S. C	48	30.08	30.13	+.04	67.1	+1.3	99	73	19	61	80	57	75	50.65	− 6.09	126	92,075	sw.	56	se.	119	177	69	4.9	0.0
Columbia, S. C	.....	.....	.....	.....	63.7	0.0	102	74	10	53	92	.....	.....	45.21	− 2.34	111	.....	ne.	.....	.....	138	105	122	.....	3.4
Augusta, Ga	180	29.90	30.09	+.02	64.8	+0.9	101	75	12	55	89	54	75	51.83	− 3.51	113	53,215	w.	38	*	156	98	111	4.8	1.0
Savannah, Ga	82	30.02	30.10	.00	67.5	+1.1	102	76	17	59	85	58	79	54.08	+ 2.17	122	71,713	sw.	40	*	161	71	133	5.1	0.0
Jacksonville, Fla	43	30.05	30.10	+.02	70.2	+1.2	99	79	21	61	78	62	82	60.70	+ 6.58	132	67,415	ne.	46	s.	132	140	93	5.1	0.0
Florida Peninsula.																									
Jupiter, Fla	28	30.05	30.08	.00	74.1	+0.5	93	80	34	68	59	66	80	87.07	+29.09	134	87,435	s.	51	se.	87	161	117	5.8	0.0
Key West, Fla	22	30.06	30.08	+.03	77.2	+0.1	91	81	51	73	40	68	76	46.46	+ 8.00	117	85,349	ne.	48	nw.	137	160	68	4.7	0.0
Tampa, Fla	36	30.06	30.10	+.02	72.2	+0.5	94	80	29	64	65	63	80	54.41	+ 1.51	120	57,848	ne.	36	*	151	163	51	4.1	0.0
East Gulf States.																									
Atlanta, Ga	1,131	28.92	30.11	.00	61.8	+0.6	97	71	6	53	91	50	74	39.26	−12.71	116	83,066	nw.	52	n.	133	104	128	5.2	6.3
Pensacola, Fla	56	30.03	30.09	+.01	68.6	+1.0	98	76	17	62	81	60	76	40.69	−16.40	116	84,165	sw.	44	sw.	131	140	94	5.0	T.
Mobile, Ala	57	30.04	30.10	+.02	67.7	+1.0	101	76	18	59	83	59	79	63.18	+ 0.57	121	64,954	n.	45	se.	153	87	125	5.4	0.0
Montgomery, Ala	221	29.85	30.08	−.02	66.5	+1.3	102	76	14	56	88	55	72	46.25	− 6.47	105	57,207	se.	54	nw.	174	107	84	4.3	T.
Vicksburg, Miss	254	29.79	30.05	−.04	66.7	+1.4	98	76	17	58	81	54	71	46.22	− 9.44	103	59,829	se.	56	nw.	190	108	67	3.9	0.5
New Orleans, La	54	30.02	30.08	+.02	70.2	+1.4	99	78	23	63	76	60	76	43.47	−17.05	108	75,946	se.	42	ne.	124	103	138	5.5	1.0
West Gulf States.																									
Shreveport, La	249	29.79	30.05	−.02	67.0	+1.8	105	77	13	57	92	53	69	36.72	−11.88	95	60,792	se.	56	s.	168	75	122	4.6	4.0
Fort Smith, Ark	481	29.53	30.04	.00	62.0	+2.2	103	73	7	52	96	50	70	39.91	− 4.83	95	57,748	e.	48	s.	196	64	105	4.2	1.3
Little Rock, Ark	302	29.75	30.07	.00	63.1	+1.6	102	73	12	53	90	49	68	46.78	− 6.85	101	60,475	sw.	46	nw.	162	95	108	4.8	0.1
Corpus Christi, Tex	20	30.02	30.04	−.01	70.7	+0.6	96	76	22	65	74	64	83	18.36	−11.84	89	103,248	se.	48	n.	160	105	100	4.5	6.0
Galveston, Tex	42	30.03	30.07	+.02	70.2	+0.4	97	75	21	66	76	63	81	29.24	−19.44	90	95,221	s.	50	n.	191	84	90	4.2	0.1
Palestine, Tex	510	29.51	30.05	−.03	67.0	+1.8	104	77	11	57	93	54	71	39.48	− 7.03	105	58,185	s.	40	nw.	143	122	100	5.0	3.0
San Antonio, Tex	704	29.30	30.03	−.01	69.5	+1.0	103	80	18	59	85	54	66	15.92	−13.78	72	75,771	se.	60	n.	142	107	116	6.0	0.2
Ohio Valley & Tenn																									
Chattanooga, Tenn	762	29.30	30.11	+.01	61.0	+1.1	98	71	6	51	92	48	69	45.29	− 9.68	116	61,085	ne.	45	w.	117	150	98	5.2	2.8
Knoxville, Tenn	1,004	29.06	30.12	+.02	59.1	+1.9	96	70	− 3	49	99	48	72	52.95	+ 1.96	137	51,417	w.	50	sw.	156	82	127	4.9	4.5
Memphis, Tenn	399	29.65	30.08	+.01	62.8	+1.7	100	72	10	54	90	49	67	46.03	− 7.25	106	83,533	sw.	49	nw.	160	108	97	4.9	0.4
Nashville, Tenn	545	29.50	30.09	+.03	60.4	+1.1	100	71	3	50	97	46	66	44.03	− 6.07	124	60,542	nw.	52	s.	171	102	92	4.4	1.6
Lexington, Ky	989	29.01	30.07	+.01	55.7	+0.7	96	65	− 6	46	102	43	67	49.19	+ 5.07	142	96,275	sw.	50	*	121	107	137	5.7	10.1
Louisville, Ky	525	29.51	30.08	+.01	57.7	+1.0	101	67	− 4	48	105	44	66	43.96	− 1.80	123	72,764	n.	44	nw.	133	91	141	5.4	5.4
Evansville, Ind	.....	.....	.....	.....	56.4	.....	100	67	− 1	46	101	.....	.....	52.70	.....	114	.....	s.	.....	.....	.....	.....	.....	.....	1.2
Indianapolis, Ind	823	29.19	30.07	+.01	53.0	+0.3	99	62	−14	44	113	42	71	42.15	− 0.81	137	87,133	nw.	66	w	140	112	113	5.1	29.6
Cincinnati, Ohio	628	29.40	30.07	.00	55.3	+0.2	98	64	−10	46	108	43	68	43.89	+ 4.02	121	66,219	nw.	41	w.	162	99	104	4.8	13.8
Columbus, Ohio	824	29.18	30.07	+.01	52.9	+0.8	102	62	−10	43	112	43	75	41.15	+ 2.26	120	64,375	w.	44	nw.	111	113	141	5.7	8.5
Pittsburg, Pa	842	29.18	30.09	+.04	53.3	+0.3	99	62	− 7	44	106	44	75	35.08	− 1.60	154	54,962	w.	43	s.	70	170	125	6.1	19.9
Parkersburg, W. Va	638	29.41	30.11	+.02	54.6	+1.3	99	65	− 7	44	106	44	74	43.78	+ 1.81	142	47,092	se.	38	w.	96	123	146	5.9	9.5
Lower Lake Region.																									
Buffalo, N. Y	768	29.20	30.03	+.01	48.0	+1.5	95	55	0	41	95	38	71	37.72	− 0.32	156	130,408	w.	76	w.	65	145	155	6.7	50.2
Oswego, N. Y	335	29.66	30.03	+.01	46.4	0.0	94	54	− 1	39	95	38	76	36.61	+ 1.59	174	99,043	se.	44	*	101	82	182	6.2	95.0
Rochester, N. Y	523	29.46	30.03	+.01	48.0	+1.2	99	56	1	40	98	38	72	30.12	− 4.70	181	71,281	sw.	47	sw.	92	114	159	6.2	66.5
Erie, Pa	714	29.28	30.05	+.03	48.6	−0.1	94	56	− 5	42	99	41	77	34.34	− 6.94	158	100,284	s.	54	s.	98	101	166	6.1	46.5
Cleveland, Ohio	762	29.22	30.04	+.02	49.5	+0.6	97	57	−15	42	112	40	74	24.54	−11.75	151	124,537	s.	68	w.	83	109	173	6.4	29.5
Sandusky, Ohio	629	29.37	30.05	.00	50.5	+0.5	100	58	−15	43	115	40	72	28.45	− 6.46	136	77,757	sw.	52	nw.	76	90	199	6.6	24.3
Toledo, Ohio	674	29.32	30.05	+.02	49.6	0.0	98	58	−16	41	114	40	76	30.35	− 0.58	133	84,156	w.	50	sw.	92	124	149	6.0	31.6
Detroit, Mich	730	29.26	30.05	+.02	48.4	+0.3	94	56	−16	41	110	40	76	30.34	− 1.99	133	79,357	sw.	48	sw.	125	101	139	5.7	34.9
Upper Lake Region.																									
Alpena, Mich	609	29.35	30.03	+.02	43.2	+1.9	98	50	− 7	36	105	37	81	32.59	− 2.49	159	80,593	nw.	42	sw	91	144	130	6.0	44.8
Grand Haven, Mich	628	29.34	30.02	+.01	47.0	+0.7	93	55	0	39	93	39	78	32.32	− 2.45	157	88,292	nw.	47	nw.	94	110	161	6.2	72.8
Marquette, Mich	734	29.19	30.00	.00	41.6	+1.1	97	49	−15	34	112	35	81	30.03	− 2.34	182	84,956	nw.	43	s.	69	114	182	6.8	130.7
Port Huron, Mich	639	29.36	30.06	+.04	46.8	+1.6	96	55	−13	39	109	39	78	32.10	+ 0.50	169	92,396	s.	52	sw.	119	130	126	5.4	36.6
Sault Ste. Marie, Mich	624	29.32	30.01	+.01	39.7	+0.7	92	48	−21	31	113	33	81	36.16	+ 6.63	160	77,089	nw.	50	nw.	100	95	170	6.3	78.9
Chicago, Ill	824	29.16	30.05	+.02	48.8	+0.5	95	56	−20	42	115	40	72	25.85	− 8.91	125	149,961	w.	72	w.	137	114	114	5.2	45.0
Milwaukee, Wis	671	29.32	30.05	+.02	46.8	+1.8	98	54	−18	39	116	38	74	31.05	− 1.01	133	88,019	w.	45	sw.	92	87	185	6.4	72.6
Greenbay, Wis	617	29.37	30.06	+.06	44.7	+1.3	95	53	−30	36	115	35	74	34.13	+ 1.83	122	69,861	s.	40	sw.	119	146	100	5.4	56.9
Duluth, Minn	702	29.24	30.02	+.02	39.5	+0.2	89	47	−29	32	118	32	78	30.94	− 0.07	138	84,060	ne.	50	nw.	116	146	103	5.3	78.5
North Dakota.																									
Moorhead, Minn	935	28.99	30.03	+.01	39.2	+1.6	97	50	−32	29	129	32	80	25.80	+ 2.03	101	90,320	se.	50	n.	132	128	105	5.0	78.8
Bismarck, N. Dak	1,674	28.22	30.03	+.02	39.5	−0.1	102	51	−36	28	138	27	65	14.33	− 4.05	98	80,325	nw.	48	nw.	169	108	88	4.7	64.7
Williston, N. Dak	1,875	27.98	30.00	.00	38.8	−0.1	101	51	−35	27	136	26	68	12.19	− 2.51	78	74,804	n.	60	nw.	207	120	38	3.8	56.3
Upper Mississippi Valley																									
Minneapolis, Minn	.....	.....	.....	.....	44.1	−0.2	96	53	−26	35	122	.....	.....	28.37	+ 1.16	118	95,260	nw.	50	*	100	119	146	....	53.4
St. Paul, Minn	837	29.11	30.03	+.04	43.7	+0.4	94	52	−26	35	120	34	73	30.52	+ 3.05	123	66,210	nw.	40	nw.	105	117	143	5.8	72.4
La Crosse, Wis	.....	.....	.....	.....	45.6	−0.4	95	55	−23	36	118	.....	.....	21.32	− 9.36	112	62,064	s.	39	w.	125	112	128	5.6	41.8
Davenport, Iowa	599	29.38	30.03	−.01	50.3	+1.1	99	59	−19	41	118	38	69	23.91	− 9.81	106	67,874	w.	40	w.	121	100	144	5.6	30.8
Des Moines, Iowa	867	29.12	30.06	+.03	49.6	+1.1	98	60	−17	40	115	38	69	27.07	− 6.04	109	71,056	sw.	50	nw.	183	82	100	4.4	31.6
Dubuque, Iowa	698	29.28	30.04	+.01	48.0	+0.4	99	57	− 3	39	122	37	72	28.16	− 7.37	113	60,452	nw.	38	sw.	181	72	112	4.5	28.3
Keokuk, Iowa	614	29.39	30.05	+.02	52.6	+1.2	98	62	−16	44	114	41	72	33.14	− 1.58	98	67,337	nw.	42	n.	162	106	97	4.6	15.5
Cairo, Ill	359	29.67	30.06	.00	59.2	+1.5	98	68	4	50	94	48	73	44.10	− 1.27	117	71,430	s.	56	s.	113	121	131	5.4	3.

TABLE I.—*Annual meteorological summary, Weather Bureau Stations*, 1897.—Continued.

Districts and stations.	Elevation of barometer above sea level.	Pressure in inches.†			Temperature of the air in degrees Fahrenheit.							Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation.			Wind.				Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall, in inches.‡
		Mean actual, 8 a. m.+8 p. m.÷2.	Mean reduced.	Departure from normal.	Mean max. min.÷2.	Departure from normal.	Maximum.	Mean maximum.	Minimum.	Mean minimum.	Annual range.			Total, in inches.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Max. velocity. Miles per hour.	Max. velocity. Direction.					
U. Miss. Valley—Cont'd.																									
Springfield, Ill	644	29.36	30.06	.00	52.9	+0.6	98	62	−11	44	109	41	69	37.58	− 0.43	117	82,204	s.	36	*	128	110	127	5.4	16.1
Hannibal, Mo	534	.....	.....	.....	53.5	.....	98	63	−10	44	108	.....	...	38.57	+ 5.87	111	9,263	sw.	44	sw.	170	92	103	4.5	16.3
St. Louis, Mo	567	29.46	30.07	+.01	57.4	+1.8	101	66	− 2	49	103	45	69	40.17	− 0.91	115	84,734	s.	50	w.	151	90	124	5.0	13.0
Missouri Valley.																									
Columbia, Mo	.....	.....	.....	.....	55.5	+1.0	102	67	− 4	44	106	.....	.....	40.15	+ 0.22	111	74,825	se.	59	nw.	121	107	137	5.7	11.9
Kansas City, Mo	963	29.03	30.05	+.01	55.4	+2.2	102	65	− 4	46	106	42	68	30.21	− 6.13	100	73,001	s.	37	*	144	111	110	4.8	28.9
Springfield, Mo	1,324	28.64	30.04	−.01	56.7	+1.8	96	66	− 1	48	97	44	69	40.71	− 5.01	107	91,002	se.	42	nw.	123	107	75	4.6	11.7
Topeka, Kans	.....	.....	.....	.....	55.3	+1.9	105	66	− 4	45	109	.....	.....	28.86	− 5.89	104	.....	s.	.....	... ..	133	152	80	.....	18.8
Lincoln, Nebr	1,199	28.74	30.03	.....	50.9	+0.8	101	61	−18	41	119	41	73	25.67	− 0.64	96	96,040	se.	55	sw.	145	154	76	4.8	19.3
Omaha, Nebr	1,103	28.85	30.03	−.01	50.9	+1.3	102	60	−13	41	115	40	71	21.30	−10.39	107	71,595	nw.	43	sw.	141	129	95	5.0	14.9
Sioux City, Iowa	1,139	.....	.....	.....	46.8	−0.7	102	58	−18	36	120	.....	.....	20.38	− 4.12	99	109,603	nw.	72	s.	150	78	137	5.2	30.1
Pierre, S. Dak	1,460	28.43	30.00	−.03	45.8	+0.2	102	57	−19	35	121	34	71	18.84	+ 3.07	84	79,004	se.	48	*	139	124	102	4.9	54.4
Huron, S. Dak	1,306	28.61	30.04	.00	42.2	−0.3	100	54	−26	31	126	32	74	22.74	+ 1.71	112	105,857	se.	51	nw.	127	145	103	5.3	59.5
Yankton, S. Dak	1,234	.....	.....	.....	46.9	+1.1	100	57	−18	36	118	.....	.....	21.76	− 5.06	107	80,383	nw.	49	s.	155	104	106	4.6	.....
Northern Slope.																									
Havre, Mont	2,494	27.32	29.98	−.03	40.0	−1.1	97	52	−43	28	140	27	68	13.30	− 0.80	84	84,374	w.	60	nw.	161	137	67	4.6	31.5
Helena, Mont	4,108	25.84	30.07	+.04	43.3	+0.2	96	53	−24	34	120	26	58	16.16	+ 2.96	114	61,868	sw.	50	sw.	145	101	119	4.9	79.6
Rapid City, S. Dak	3,251	26.60	29.99	−.03	46.5	+0.5	101	58	−20	35	121	29	60	12.32	− 4.39	89	69,324	nw.	42	nw.	124	121	120	5.3	38.3
Cheyenne, Wyo	6,105	24.01	30.04	+.01	44.5	+0.1	92	57	−21	32	113	24	52	17.25	+ 5.05	106	91,991	nw.	54	w.	138	136	71	4.9	41.9
Lander, Wyo	5,372	24.64	30.06	+.02	42.6	0.0	91	57	−21	29	112	24	58	11.21	− 2.24	75	41,057	sw.	42	w.	126	157	82	5.0	52.4
North Platte, Nebr	2,826	27.09	30.04	.00	49.6	+1.7	103	62	− 9	38	113	37	70	17.09	− 1.18	88	82,021	nw.	51	nw.	143	165	57	4.6	33.9
Middle Slope.																									
Denver, Colo	5,290	24.73	30.03	+.02	49.4	0.0	96	62	−14	37	110	28	52	15.37	+ 0.88	89	68,349	s.	60	se.	98	180	87	5.1	39.2
Pueblo, Colo	4,713	25.27	30.00	.00	51.5	+0.4	101	66	−16	37	117	37	50	12.71	+ 0.60	70	63,250	nw.	56	n.	140	170	55	4.6	24.6
Concordia, Kans	1,398	28.53	30.02	−.04	54.0	+1.8	102	65	− 6	43	108	41	69	31.45	+ 5.96	91	64,520	s.	42	s.	156	119	90	4.8	16.1
Dodge City, Kans	2,504	27.40	30.01	+.01	54.8	+1.7	101	67	− 3	42	104	40	67	21.56	+ 1.72	78	28,068	s.	67	s.	197	124	44	3.7	39.8
Wichita, Kans	1,331	28.60	30.03	+.01	57.2	+1.8	102	68	− 1	46	103	42	66	26.01	− 2.76	88	77,595	s.	40	n.	176	110	79	4.1	16.2
Oklahoma, Okla	1,218	28.75	30.04	+.01	59.4	0.0	103	70	3	49	100	47	71	28.47	− 4.82	86	87,198	s.	48	nw.	226	79	60	3.5	5.1
Southern Slope.																									
Abilene, Tex	1,749	28.23	30.05	+.01	63.8	+0.4	105	75	5	53	100	47	64	23.30	− 1.72	76	81,845	se.	48	nw.	166	118	81	4.1	4.6
Amarillo, Tex	3,691	26.28	30.03	.00	55.1	−0.3	102	67	− 1	43	103	38	62	19.16	+ 0.97	94	134,590	s.	66	w.	155	124	86	4.5	22.7
Southern Plateau.																									
El Paso, Tex	3,767	26.19	29.97	+.02	63.1	−0.3	102	76	17	50	85	32	41	12.41	+ 3.08	51	94,593	nw.	60	sw.	195	128	42	3.4	3.1
Santa Fe, N. Mex	6,998	23.29	30.02	.00	48.2	−0.1	85	58	− 1	38	86	27	52	20.40	+ 6.15	130	58,374	se.	40	*	176	149	40	4.1	34.0
Phœnix, Ariz	1,076	28.76	29.88	.....	68.7	−0.2	110	83	23	55	87	39	42	9.87	+ 2.66	40	35,948	e.	29	n.	247	87	31	2.5	0.0
Middle Plateau.																									
Carson City, Nev.	4,720	25.98	30.05	.....	48.6	−1.0	95	62	−14	35	109	27	51	13.63	+ 1.66	68	52,502	sw.	50	*	185	126	54	3.8	7.4
Salt Lake City, Utah	4,344	25.66	30.07	+.02	50.2	−1.1	98	61	2	40	96	34	60	16.74	+ 0.55	101	51,723	se.	40	*	117	90	158	6.0	62.3
Northern Plateau.																									
Baker City, Oreg	3,470	26.45	30.05	+.04	45.7	+0.8	98	56	− 4	35	102	29	60	14.68	− 0.47	127	52,507	s.	40	s.	108	106	151	5.8	45.7
Idaho Falls, Idaho	4,742	25.25	30.07	+.02	43.3	+1.6	96	56	−17	31	113	29	67	15.77	+ 0.89	114	88,277	s.	51	s.	153	73	137	5.0	91.7
Spokane, Wash	1,943	27.96	30.02	.00	48.1	+0.3	100	58	3	39	97	34	66	23.84	+ 5.48	134	49,214	sw.	37	sw.	118	69	178	6.1	65.3
Walla Walla, Wash	1,018	28.93	30.04	.00	53.1	−0.1	105	63	0	44	105	39	65	21.67	+ 4.90	122	50,801	s.	36	s.	143	139	83	4.8	36.9
North Pacific Coast.																									
Port Canby, Wash	179	29.83	30.03	+.01	50.4	0.0	85	55	26	46	59	46	87	75.15	+12.88	210	120,551	n.	95	s.	80	85	200	6.8	8.5
Port Angeles, Wash	29	.....	.....	.....	47.4	+0.8	81	54	19	41	62	.....	.....	29.12	− 1.18	140	51,369	w.	36	w.	93	127	145	6.0	10.5
Pysht, Wash.§	.....	.....	.....	.....	48.5	.....	83	56	22	41	61	.....	....	68.31	− 0.31	177	.....	w.	....	.....	106	47	183	.....	20.0
Seattle, Wash	119	29.90	30.03	.....	51.5	+0.6	90	58	29	45	70	43	76	41.53	+ 4.09	157	47,130	se.	40	s.	96	117	152	6.0	31.2
Tatoosh Island, Wash	86	29.93	30.03	+.02	48.1	−0.3	68	52	25	44	43	43	82	95.21	+ 2.33	191	113,557	e.	63	e.	81	53	231	7.2	15.5
Portland, Oreg	153	29.88	30.04	−.02	53.1	0.0	95	61	22	46	73	43	73	43.01	− 4.03	164	75,758	nw.	55	s.	94	146	125	5.5	8.8
Roseburg, Oreg	521	29.48	30.05	−.03	53.5	+0.8	98	63	28	44	70	43	74	34.83	− 0.33	146	31,651	nw.	32	sw.	117	115	133	5.5	3.7
Middle Pacific Coast.																									
Eureka, Cal	64	30.03	30.09	+.03	51.6	+0.2	82	58	30	46	52	46	86	44.50	− 1.33	140	53,513	nw.	45	w.	92	162	111	5.6	0.5
Redbluff, Cal	334	29.66	30.01	+.01	62.0	−0.5	109	73	27	51	82	40	54	20.08	− 6.03	74	52,983	se.	36	se.	223	70	72	3.3	0.0
Sacramento, Cal	71	.....	.....	.....	59.8	0.0	105	71	28	49	77	.....	.....	15.32	− 5.55	56	75,312	sw.	44	se.	214	91	60	3.4	0.0
San Francisco, Cal	153	29.89	30.05	+.02	55.1	−0.7	92	61	38	49	54	47	80	16.40	− 7.31	67	94,885	w.	45	w.	165	131	69	4.4	0.0
Point Reyes Light, Cal	.....	.. ..	.....	.....	52.7	+0.3	92	58	35	47	57	.....	.....	21.55	− 9.01	71	160,887	nw.	75	nw.	154	74	137	.....	T.
South Pacific Coast.																									
Fresno, Cal	332	29.63	29.98	−.01	62.3	−0.7	110	75	23	49	87	42	57	8.41	− 0.59	51	47,509	nw.	33	sw.	249	60	56	2.8	0.0
Los Angeles, Cal	330	29.64	29.99	.00	61.8	+0.4	97	72	30	51	67	49	72	14.28	− 3.02	35	38,674	w.	34	e.	145	185	35	3.6	0.0
San Diego, Cal	87	29.90	30.00	−.01	61.0	+0.3	89	67	36	55	53	50	73	8.93	− 1.58	42	49,149	nw.	35	sw.	208	42	55	3.0	0.0
San Luis Obispo, Cal	201	29.83	30.05	.....	58.3	.....	96	71	24	45	72	45	69	14.59	.....	43	42,017	n.	28	w.	213	102	50	3.5	0.0

* More than one direction. † Not reduced to standard gravity. ‡ For the snow year, July 1, 1896, to June 30, 1897. § Record incomplete.

TABLE II.—*Annual meteorological summary, Canadian stations*, 1897.

Stations.	Pressure.*			Temperature.		Precipitation.		Prevailing direction of wind.	Total depth of snowfall.†	Stations.	Pressure.*			Temperature.		Precipitation.		Prevailing direction of wind.	Total depth of snowfall.†
	Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Departure from normal.	Total.	Departure from normal.				Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Departure from normal.	Total.	Departure from normal.		
	Ins.	*Ins.*	*Ins.*	°	°	*Ins.*	*Inches.*				*Ins.*	*Ins.*	*Ins.*	°	°	*Ins.*	*Inches.*		
St. Johns, N. F.	29.70	29.85	—.07	39.9	—0.6	62.83	.....	s.	206.1	Parry Sound, Ont.	29.30	30.01	+.01	40.6	+0.4	46.28	+ 8.96	w.	122.9
Sydney, C. B. I.	29.92	29.98	+.05	41.6	+0.3	39.27	—13.07	nw.	92.5	Port Arthur, Ont	29.28	29.99	.00	35.4	+1.0	24.51	+ 0.47	w.	42.0
Halifax, N. S.	29.90	30.03	+.07	43.0	+0.2	51.46	— 3.98	w.	86.1	Winnipeg, Man.	29.14	30.00	—.01	33.3	+0.2	17.59	— 5.86	w.	47.1
Grand Manan, N. B.	29.94	29.99	+.01	42.4	—0.4	47.41	+ 2.79	nw.	51.7	Minnedosa, Man.	28.16	30.01	+.02	32.2	+0.6	13.99	— 3.74	nw.	59.8
Yarmouth, N. S.	29.94	30.02	+.04	43.2	0.0	52.06	+ 5.93	nw.	93.4	Qu'Appelle, Assin.	27.68	29.99	.00	32.8	—0.5	12.65	— 2.29	nw.	40.9
Charlottetown, P. E. I.	29.93	29.97	+.02	41.0	0.0	39.27	— 2.51	nw.	57.4	Medicine Hat, Assin.	27.64	29.98	+.01	38.4	—1.9	17.25	+ 6.48	s.	40.8
Chatham, N. B.	29.95	29.97	+.02	38.4	—0.3	40.14	— 3.82	w.	93.7	Swift Current, Assin.	27.38	30.01	+.01	36.1	—1.4	16.24	+ 0.39	w.	30.5
Father Point, Que.	29.94	29.97	+.03	34.6	—0.2	37.75	+ 7.95	w.	87.0	Calgary, Alberta	26.38	29.98	.00	35.5	—1.7	20.58	+ 7.30	w.	43.5
Quebec, Que.	29.66	30.00	+.03	38.0	—0.2	37.60	— 5.18	ne.	92.8	Prince Albert, Sask.	28.39	29.94	.....	34.8	+4.3	18.03	.....	nw.	51.0
Montreal, Que.	29.79	30.00	+.02	41.4	—0.1	39.12	+ 0.31	sw.	84.9	Edmonton, Alberta	27.61	30.00	+.04	34.8	—0.8	14.55	+ 0.74	nw.	54.8
Rockliffe, Ont.	29.48	30.00	+.02	37.3	—0.3	34.50	+ 3.45	nw.	96.0	Battleford, Sask.	28.22	30.00	.....	32.6	—0.1	16.53	.....	sw.	27.6
Kingston, Ont.	29.70	30.02	+.04	43.6	+0.5	28.32	— 5.62	sw.	.....	Kamloops, B. C.	28.68	29.93	.....	46.1	.....	12.73	.....	e.	.....
Toronto, Ont.	29.65	30.04	+.02	44.9	+0.7	32.56	+ 1.81	n.	45.4	Banff, Alberta	25.30	30.03	.....	32.9	.....	23.40	.....	sw.	93.1
White River, Ont.	28.66	30.05	+.03	31.6	—0.5	17.58	— 5.75	n.	72.6	Esquimalt, B. C.	29.98	30.01	.....	47.3	—1.1	39.77	.....	n.	31.0
Port Stanley, Ont.	29.40	30.05	+.02	44.8	+0.1	34.47	+ 0.30	w.	53.8	Ottawa, Ont.	29.67	30.04	.....	40.4	—0.2	33.03	.....	w.	.....
Saugeen, Ont.	29.30	30.03	+.03	42.9	+0.5	40.41	+ 6.03	nw.	133.8	Hamilton, Bermuda	29.97	30.13	+.04	70.2	+0.5	60.63	.....	s.	00.0

*Not reduced to standard gravity. †For the snow year, July 1, 1896, to June 30, 1897.

TABLE III.—*Accumulated departures of average monthly temperatures during* 1897 *from the normal.*

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual departures.
New England	+ 0.5	+ 1.6	+ 3.6	+ 5.2	+ 5.6	+ 3.1	+ 3.7	+ 3.8	+ 3.9	+ 5.5	+ 4.7	+ 5.5	+ 0.46
Middle Atlantic	— 1.8	— 1.7	+ 2.1	+ 2.9	+ 2.4	+ 0.7	+ 0.7	+ 0.9	+ 1.6	+ 3.0	+ 3.1	+ 4.0	+ 0.33
South Atlantic	— 3.3	— 2.8	+ 0.7	+ 1.0	— 0.5	+ 1.1	+ 0.7	+ 1.3	+ 1.3	+ 2.8	+ 4.5	+ 5.5	+ 0.46
Florida Peninsula	— 2.9	— 0.7	+ 3.7	+ 2.5	+ 0.9	+ 1.4	+ 0.1	0.0	— 1.8	— 3.1	— 1.4	— 0.4	— 0.03
East Gulf	— 2.6	— 3.3	+ 2.2	+ 0.6	— 1.0	+ 1.1	+ 1.9	+ 1.8	+ 2.9	+ 5.9	+ 7.8	+ 8.4	+ 0.70
West Gulf	— 0.3	+ 1.6	+ 5.8	+ 5.2	+ 4.5	+ 5.1	+ 6.2	+ 6.9	+ 9.0	+13.1	+14.2	+11.0	+ 0.92
Ohio Valley and Tennessee	— 1.7	— 0.9	+ 3.0	+ 2.4	— 1.5	— 1.7	— 1.1	— 0.9	+ 2.9	+ 8.4	+ 9.0	+ 8.6	+ 0.72
Lower Lakes	— 0.8	+ 0.5	+ 3.9	+ 5.2	+ 3.8	+ 1.4	+ 3.6	+ 2.5	+ 4.9	+ 8.9	+ 8.5	+ 7.5	+ 0.62
Upper Lakes	+ 2.5	+ 6.7	+ 7.8	+ 8.8	+ 8.3	+ 6.2	+ 9.2	+ 8.9	+14.7	+19.8	+18.7	+15.9	+ 1.32
North Dakota	+ 3.5	+ 2.8	— 8.8	— 7.0	— 3.9	— 5.6	— 5.0	— 5.8	+ 3.7	+ 8.1	+ 2.5	+ 2.8	+ 0.23
Upper Mississippi Valley	+ 1.0	+ 3.8	+ 3.3	+ 2.6	+ 1.5	+ 1.2	+ 2.6	+ 1.7	+ 9.6	+16.2	+14.7	+ 9.7	+ 0.81
Missouri Valley	+ 2.1	+ 3.2	+ 1.4	+ 0.5	+ 0.9	+ 0.6	+ 2.1	+ 0.8	+ 9.8	+15.2	+13.7	+ 8.9	+ 0.74
Northern Slope	+ 3.9	+ 4.4	— 4.6	— 4.6	+ 1.0	— 0.2	— 2.1	— 2.1	+ 3.0	+ 5.1	+ 2.4	— 0.1	— 0.01
Middle Slope	+ 2.6	+ 2.8	+ 2.0	+ 1.5	+ 2.3	+ 2.7	+ 2.9	+ 3.0	+ 8.6	+12.2	+12.8	+ 8.4	+ 0.70
Southern Slope	— 3.2	+ 0.4	+ 1.2	0.0	— 0.8	— 0.6	— 0.2	0.0	0.0	+ 1.8	+ 3.6	0.0	0.0
Southern Plateau	+ 0.3	— 1.3	— 5.7	— 5.1	— 3.4	— 4.5	— 6.1	— 6.4	— 5.2	— 6.5	— 4.3	— 7.5	— 0.62
Middle Plateau	+ 3.0	— 0.3	— 8.8	— 9.3	— 4.1	— 5.6	— 8.0	— 5.8	— 5.7	— 6.7	— 4.6	— 8.8	— 0.73
Northern Plateau	+ 4.2	+ 9.6	+ 3.0	+ 4.5	+ 9.5	+ 9.0	+ 5.4	+ 8.2	+ 8.3	+ 8.6	+ 9.5	+ 7.8	+ 0.65
North Pacific	+ 1.9	+ 3.0	— 2.6	— 1.4	+ 0.2	+ 0.4	— 1.2	+ 1.2	+ 0.4	+ 0.4	— 1.0	+ 0.1	+ 0.01
Middle Pacific	+ 0.2	— 0.5	— 5.8	— 4.0	— 2.5	— 2.2	— 1.6	— 2.0	— 2.3	— 2.3	— 4.7	— 5.6	— 0.47
South Pacific	+ 1.3	+ 0.4	— 4.1	— 2.9	— 2.2	— 3.5	— 4.1	— 4.3	— 4.9	— 7.6	— 7.9	— 9.0	— 0.75

TABLE IV.—*Accumulated departures of total monthly and annual precipitation during* 1897 *from the normal.*

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
New England	—0.40	—1.70	—2.40	—1.70	—1.00	—0.80	+1.80	+1.70	+0.50	— 2.20	+ 0.20	+ 0.90	+ 0.90
Middle Atlantic	—1.70	—1.00	—2.00	—2.80	—1.50	—2.40	—0.40	—2.10	—4.60	— 4.60	— 4.10	— 3.50	— 3.50
South Atlantic	—2.30	+1.00	+0.30	0.00	—1.50	—2.30	—1.70	—3.30	—4.90	— 3.40	— 4.80	— 4.70	— 4.70
Florida Peninsula	—0.80	+0.70	+0.40	+4.40	+5.60	+4.60	+3.80	+4.50	+9.40	+11.00	+11.30	+11.30	+11.30
East Gulf	—1.80	—0.60	—0.30	+1.00	—1.80	—3.90	—2.00	—1.80	—3.70	— 4.60	— 5.90	— 5.30	— 5.30
West Gulf	+1.10	—1.60	+0.60	—0.90	—2.70	—3.90	—5.80	—6.40	—8.90	— 8.70	—11.30	—10.50	—10.50
Ohio Valley and Tennessee	—1.50	—0.90	+2.30	+2.80	+2.30	+1.20	+2.50	+1.20	—1.10	— 2.80	— 1.90	— 1.30	— 1.30
Lower Lakes	0.00	—1.10	—0.50	—0.80	—1.20	—2.10	—0.70	—1.10	—3.30	— 5.50	— 3.50	— 3.90	— 3.90
Upper Lakes	+1.50	—1.10	—0.10	+0.50	—0.30	—0.60	+0.20	—0.30	—2.10	— 2.80	— 2.90	— 3.10	— 3.10
North Dakota	+0.30	+1.00	+1.60	+0.80	—0.70	0.00	+0.80	+0.10	—0.70	— 1.10	— 1.50	— 1.90	— 1.90
Upper Mississippi Valley	+1.80	+1.50	+3.30	+4.10	+1.80	+2.30	+3.00	+1.70	—0.40	— 2.20	— 2.00	— 2.10	— 2.10
Missouri Valley	+1.70	+1.50	+2.40	+3.50	+0.70	+0.50	—0.30	—1.30	—2.80	— 3.20	— 3.80	— 3.30	— 3.30
Northern Slope	—0.20	0.00	+0.80	+0.40	—0.80	—0.90	—1.00	—1.00	—1.60	— 1.20	— 0.50	— 0.30	— 0.30
Middle Slope	+0.10	+0.60	—0.90	+1.90	+1.20	+1.00	+0.90	+0.70	—0.20	+ 1.20	+ 0.60	+ 0.30	+ 0.30
Southern Slope	+1.00	0.00	+1.40	+0.50	+2.30	+2.10	+2.30	+1.70	+1.20	+ 0.80	0.00	— 0.60	— 0.60
Southern Plateau	+1.50	+1.30	+1.50	+1.50	+2.30	+2.60	+2.70	+2.80	+4.20	+ 4.20	+ 3.70	+ 3.20	+ 3.20
Middle Plateau	—0.60	+1.20	+1.50	+0.90	+0.40	+0.10	+0.20	+0.10	—0.20	+ 0.60	+ 0.30	0.00	0.00
Northern Plateau	—1.00	—0.40	+0.60	+0.20	—0.20	+0.30	+0.30	+0.40	+0.70	— 0.10	+ 2.30	+ 2.50	+ 2.50
North Pacific	—2.10	—0.70	+1.00	—0.80	—1.90	—1.80	—1.50	—1.60	—2.70	— 5.40	— 0.70	+ 3.00	+ 3.00
Middle Pacific	—2.60	—0.50	+0.40	—1.10	—2.40	—2.20	—2.30	—2.30	—2.60	— 1.90	— 2.80	— 5.80	— 5.80
South Pacific	+0.80	+2.30	+2.20	+1.20	+0.90	+0.80	+0.80	+0.80	+0.70	+ 1.70	+ 0.60	— 1.60	— 1.60

TABLE V.—*Resultant winds from observations at 8 a. m. and 8 p. m., daily, during the year, 1897.*

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
New England.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Eastport, Me	234	214	132	287	n. 83 w.	158
Portland, Me	245	215	97	323	n. 82 w.	228
Northfield, Vt	208	380	48	113	s. 30 w.	129
Boston, Mass	227	182	117	357	n. 80 w.	244
Nantucket, Mass	222	246	137	305	s. 82 w.	170
Woods Hole, Mass.*	75	167	69	130	s. 34 w.	110
Block Island, R. I	221	194	161	369	n. 82 w.	210
New Haven Conn	302	196	124	266	n. 54 w.	178
Middle Atlantic States.						
Albany, N. Y	247	283	69	224	s. 77 w.	159
Binghamton, N. Y.†	127	73	111	138	n. 18 w.	57
New York, N. Y	235	236	153	294	n. 86 w.	141
Harrisburg, Pa	193	159	231	278	n. 54 w.	58
Philadelphia, Pa	275	197	168	268	n. 52 w.	127
Atlantic City, N. J	234	214	155	303	n. 82 w.	149
Baltimore, Md	221	153	218	276	n. 41 w.	89
Washington, D. C	301	218	160	190	n. 20 w.	88
Lynchburg, Va	222	224	184	272	s. 89 w.	88
Norfolk, Va	245	242	257	176	n. 88 e.	81
South Atlantic States.						
Charlotte, N. C	169	289	298	132	s. 54 e.	205
Hatteras, N. C	275	307	305	208	n. 2 w.	68
Kittyhawk, N. C.						
Raleigh, N. C	266	222	147	228	n. 62 w.	92
Wilmington, N. C	239	223	186	234	n. 72 w.	51
Charleston, S. C	232	217	202	230	n. 64 w.	32
Augusta, Ga	225	207	195	255	n. 73 w.	63
Savannah, Ga	225	255	183	225	s. 55 w.	52
Jacksonville, Fla	253	229	238	220	n. 77 e.	18
Florida Peninsula.						
Jupiter, Fla	160	268	255	182	s. 34 e.	130
Key West, Fla	219	180	437	67	n. 84 e.	378
Tampa, Fla	288	144	247	216	n. 12 e.	149
Eastern Gulf States.						
Atlanta, Ga	235	155	231	286	n. 34 w.	97
Pensacola, Fla	260	241	201	225	n. 51 w.	31
Mobile, Ala	293	254	138	187	n. 51 w.	63
Montgomery, Ala	216	222	242	207	s. 80 e.	36
Vicksburg, Miss	227	250	269	150	s. 79 e.	113
New Orleans, La	212	273	274	149	s. 64 e.	140
Western Gulf States.						
Shreveport, La	187	326	239	172	s. 26 e.	154
Fort Smith, Ark	168	134	354	170	n. 80 e.	187
Little Rock, Ark	220	244	185	223	s. 58 w.	45
Corpus Christi, Tex	209	288	337	70	s. 73 e.	278
Galveston, Tex	182	339	241	123	s. 6 e.	158
Palestine, Tex	251	316	211	114	s. 56 e.	117
San Antonio, Tex	267	270	305	69	e.	236
Ohio Valley and Tennessee.						
Chattanooga, Tenn	250	245	176	239	n. 86 w.	63
Knoxville, Tenn	292	149	181	271	n. 32 w.	169
Memphis, Tenn	282	240	216	198	s. 66 e.	20
Nashville, Tenn	233	234	161	263	s. 90 w.	102
Lexington, Ky	197	267	183	271	s. 51 w.	112
Louisville, Ky	230	258	181	195	s. 37 w.	31
Indianapolis, Ind	252	225	155	251	n. 74 w.	100
Cincinnati, Ohio	212	231	233	232	s. 3 e.	19
Columbus, Ohio	195	230	202	281	s. 72 w.	83
Pittsburg, Pa	170	256	159	303	s. 59 w.	168
Parkersburg, W. Va	210	192	98	216	n. 81 w.	119
Lower Lake Region.						
Buffalo, N. Y	151	247	157	331	s. 61 w.	199
Oswego, N. Y						
Rochester, N. Y	136	281	132	378	s. 59 w.	285
Erie, Pa	144	281	148	279	s. 44 w.	190
Cleveland, Ohio	182	303	186	227	s. 19 w.	128
Sandusky, Ohio	168	233	198	286	s. 54 w.	109
Toledo, Ohio	159	192	203	320	s. 74 w.	122
Detroit, Mich	205	227	176	286	s. 79 w.	112
Upper Lake Region.						
Alpena, Mich	220	208	176	292	n. 84 w.	117
Grand Haven, Mich	242	179	234	246	n. 11 w.	64
Marquette, Mich	297	198	102	295	n. 62 w.	217
Port Huron, Mich	225	281	140	227	s. 57 w.	104
Sault Ste. Marie, Mich	217	184	263	239	n. 36 e.	41
Chicago, Ill	231	214	178	248	n. 76 w.	72
Milwaukee, Wis	220	199	192	268	n. 74 w.	79

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
Upper Lake Region—Cont'd.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Greenbay, Wis	213	271	139	241	s. 61 w.	117
Duluth, Minn	343	128	185	280	n. 24 w.	235
North Dakota.						
Moorhead, Minn	259	227	236	226	n. 17 e.	34
Bismarck, N. Dak	284	166	257	214	n. 11 e.	120
Williston, N. Dak	303	204	155	199	n. 24 w.	108
Upper Mississippi Valley.						
St. Paul, Minn	222	184	104	275	n. 78 w.	175
La Crosse, Wis.†	115	157	57	100	s. 46 w.	60
Davenport, Iowa	193	178	228	286	n. 76 w.	60
Des Moines, Iowa	256	227	200	229	n. 45 w.	41
Dubuque, Iowa	189	230	176	290	s. 70 w.	121
Keokuk, Iowa	230	256	179	261	s. 73 w.	86
Cairo, Ill	250	267	183	174	s. 28 e.	19
Springfield, Ill	202	264	173	241	s. 47 w.	92
Hannibal Mo.†	102	141	89	160	s. 61 w.	81
St. Louis, Mo	211	250	198	202	s. 5 w.	48
Missouri Valley.						
Columbia, Mo.*	109	116	119	106	s. 62 e.	15
Kansas City, Mo	258	273	188	178	s. 34 e.	18
Springfield, Mo	196	313	231	169	s. 28 e.	132
Lincoln, Nebr	256	280	230	140	s. 75 e.	93
Omaha, Nebr	295	251	176	170	n. 8 e.	44
Sioux City, Iowa†	138	126	107	76	n. 69 e.	34
Pierre, S. Dak	247	301	289	169	n. 69 e.	128
Huron, S. Dak	282	243	224	177	n. 50 e.	61
Yankton, S. Dak†	210	172	193	179	n. 20 e.	40
Northern Slope.						
Havre, Mont	210	143	151	385	n. 74 w.	244
Miles City, Mont						
Helena, Mont	173	255	32	454	s. 79 w.	430
Rapid City, S. Dak	248	162	182	334	n. 60 w.	175
Cheyenne, Wyo	298	173	68	344	n. 65 w.	303
Lander, Wyo	169	314	181	273	s. 33 w.	172
North Platte, Nebr	195	246	170	277	s. 64 w.	119
Middle Slope.						
Denver, Colo	213	328	138	179	s. 30 w.	122
Pueblo, Colo	262	140	203	276	n. 31 w.	142
Concordia, Kans	198	320	181	135	s. 21 e.	130
Dodge City, Kans	221	332	143	168	s. 13 w.	116
Wichita, Kans	236	342	190	103	s. 40 e.	137
Oklahoma, Okla	216	369	160	120	s. 15 e.	158
Southern Slope.						
Abilene, Tex	180	348	238	144	s. 30 e.	193
Amarillo, Tex	161	392	93	168	s. 18 w.	243
Southern Plateau.						
El Paso, Tex	249	92	279	295	n. 6 w.	158
Santa Fe, N. Mex	211	268	281	149	s. 67 e.	144
Phœnix, Ariz	210	98	119	251	n. 50 w.	173
Yuma, Ariz						
Middle Plateau.						
Carson City, Nev	305	238	87	360	s. 85 w.	278
Winnemucca, Nev						
Salt Lake City, Utah	173	265	248	225	s. 14 e.	94
Northern Plateau.						
Baker City, Oreg	230	350	142	168	s. 12 w.	123
Idaho Falls, Idaho	249	384	63	95	s. 14 w.	139
Spokane, Wash	177	296	210	201	s. 4 e.	119
Walla Walla, Wash	108	405	120	197	s. 14 w.	307
North Pacific Coast Region.						
Fort Canby, Wash	238	211	196	177	n. 35 e.	33
Port Angeles, Wash.*	54	69	112	196	s. 80 w.	85
Seattle, Wash	218	301	189	155	s. 22 e.	90
Tatoosh Island, Wash	81	276	270	195	s. 21 e.	209
Portland, Oreg						
Roseburg, Oreg	273	171	200	221	n. 12 w.	104
Middle Pacific Coast Region.						
Eureka, Cal	230	226	152	309	n. 88 w.	157
Redbluff, Cal	322	228	184	188	n. 2 w.	94
Sacramento, Cal	227	345	123	239	s. 45 w.	166
San Francisco, Cal	137	150	42	500	s. 88 w.	458
South Pacific Coast Region.						
Fresno, Cal	361	72	115	401	n. 45 w.	407
Los Angeles, Cal	302	129	178	361	n. 69 w.	200
San Diego, Cal	306	136	142	339	n. 49 w.	260
San Luis Obispo, Cal	321	152	36	299	n. 57 w.	318

*From observations at 8 p. m. only. †From observations at 8 a. m. only.

TABLE VI.—*Total number of reports of thunderstorms during* 1897.

State.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Alabama	0	28	44	37	18	88	101	63	14	11	0	11	415
Arizona	11	4	7	6	26	16	71	69	88	21	0	1	320
Arkansas	25	29	68	58	47	155	120	86	15	24	36	9	672
California	20	24	9	10	44	29	15	79	33	17	11	7	298
Colorado	1	3	8	36	171	168	138	236	108	46	2	0	917
Connecticut	0	0	9	0	45	21	57	60	26	0	5	1	224
Delaware	0	3	5	4	11	18	13	5	1	3	1	0	64
Dist. of Columbia	0	1	0	2	5	6	8	8	1	0	0	0	31
Florida	7	24	17	68	59	239	169	239	121	18	2	9	972
Georgia	0	20	55	50	27	117	110	35	17	18	5	0	454
Idaho	3	0	7	10	76	58	39	43	37	17	0	0	290
Illinois	22	74	174	155	80	329	245	128	70	14	83	4	1,378
Indiana	8	51	86	42	69	94	96	66	28	11	49	0	600
Indian Territory	2	3	8	10	11	6	6	6	3	3	1	4	63
Iowa	1	22	112	114	99	142	203	138	59	7	9	7	913
Kansas	0	15	98	80	101	202	95	104	16	28	7	2	748
Kentucky	2	77	87	31	45	129	115	69	20	9	14	6	604
Louisiana	27	62	107	105	72	132	114	110	45	50	10	26	860
Maine	0	0	2	0	4	24	30	27	9	3	2	0	101
Maryland	0	24	25	17	73	100	128	113	20	19	8	1	528
Massachusetts	0	0	4	2	35	56	34	86	30	2	4	0	253
Michigan	11	5	62	73	79	141	136	131	50	36	5	0	729
Minnesota	0	0	24	26	35	178	236	121	52	27	0	0	699
Mississippi	5	28	104	37	44	81	124	95	17	20	8	15	578
Missouri	42	70	250	176	183	527	236	159	56	39	59	15	1,812
Montana	0	5	1	1	36	69	21	27	18	3	0	2	193
Nebraska	0	6	80	63	88	195	101	117	45	15	3	0	713
Nevada	2	3	0	7	61	28	67	69	15	41	3	0	296
New Hampshire	0	0	0	0	23	43	57	34	15	2	0	0	174
New Jersey	1	11	25	50	101	111	223	163	60	14	11	0	770
New Mexico	0	0	7	25	65	13	36	88	37	14	0	1	286
New York	4	2	42	38	63	92	240	124	55	38	19	0	717
North Carolina	2	34	71	75	172	244	221	130	57	26	6	12	1,050
North Dakota	0	0	8	1	32	74	75	41	11	2	1	0	245
Ohio	50	44	165	71	170	316	439	274	88	7	56	0	1,680
Oklahoma	2	9	13	21	39	24	14	17	6	10	3	3	161
Oregon	1	0	2	3	30	42	6	49	21	3	9	24	190
Pennsylvania	3	10	58	48	94	164	299	164	67	22	32	0	961
Rhode Island	0	0	0	1	7	5	5	12	2	0	1	0	33
South Carolina	0	16	98	58	77	208	143	83	37	21	4	3	748
South Dakota	0	0	5	15	33	87	71	35	34	16	0	0	296
Tennessee	7	63	156	83	55	182	180	112	23	21	18	4	904
Texas	17	23	88	57	130	55	68	43	31	45	5	6	568
Utah	0	1	2	12	50	25	51	51	60	40	2	2	296
Vermont	0	0	3	2	15	29	70	45	9	5	0	0	178
Virginia	0	68	21	31	69	81	105	101	10	0	2	1	489
Washington	0	1	2	2	43	46	6	42	12	4	8	9	175
West Virginia	0	44	18	9	26	59	97	41	13	0	5	5	317
Wisconsin	1	0	21	33	36	228	113	87	64	31	1	2	617
Wyoming	0	0	4	4	27	33	29	35	6	2	1	0	141

TABLE VII.—*Number of days on which thunderstorms were reported.*

Alabama	0	9	18	14	8	25	23	25	7	3	0	5	137
Arizona	7	3	4	3	10	5	20	26	27	11	0	1	117
Arkansas	4	8	22	15	13	23	24	19	8	8	8	3	155
California	5	7	7	5	10	10	4	15	13	5	4	3	88
Colorado	1	3	5	13	29	26	28	27	25	16	1	0	174
Connecticut	0	0	1	0	9	6	15	15	7	0	2	1	56
Delaware	0	1	4	3	5	10	9	4	1	3	1	0	41
Dist. of Columbia	0	1	0	2	5	6	8	8	1	0	0	0	31
Florida	5	12	10	19	12	30	30	31	26	10	1	3	189
Georgia	0	12	16	11	12	27	26	16	10	6	3	0	139
Idaho	3	0	3	6	18	19	15	14	13	8	0	0	99
Illinois	5	5	17	20	14	26	26	20	8	4	14	2	161
Indiana	2	5	13	9	10	14	23	13	4	4	10	0	107
Indian Territory	2	2	6	5	8	4	5	5	3	2	1	3	46
Iowa	1	5	12	17	13	25	21	23	8	5	1	1	132
Kansas	0	3	17	19	17	29	21	20	6	7	5	2	146
Kentucky	2	6	18	8	18	22	25	17	8	2	7	2	135
Louisiana	9	14	22	19	14	27	23	27	14	12	4	12	197
Maine	0	0	1	0	3	11	13	12	5	1	1	0	48
Maryland	0	3	7	5	18	16	24	19	5	7	6	1	111
Massachusetts	0	0	3	2	6	11	9	21	8	1	1	0	62
Michigan	2	1	6	9	16	21	26	23	13	10	4	0	131
Minnesota	0	0	8	9	12	20	26	22	13	7	0	0	117
Mississippi	2	9	25	11	13	25	22	28	10	5	4	7	161
Missouri	6	7	23	23	21	29	26	22	8	8	12	5	190
Montana	0	2	1	1	18	25	11	14	11	3	0	1	87
Nebraska	0	2	17	18	19	2	26	22	14	6	2	0	128
Nevada	1	3	0	3	19	16	18	22	7	13	2	0	104
New Hampshire	0	0	0	0	10	13	18	9	4	2	0	0	56
New Jersey	1	2	5	9	15	17	20	20	13	6	4	0	112
New Mexico	0	0	3	8	24	9	18	29	15	8	0	1	115
New York	2	1	3	9	17	14	29	19	11	7	4	0	116
North Carolina	1	8	14	13	22	27	29	25	10	6	2	4	161
North Dakota	0	0	5	1	14	14	22	16	5	2	1	0	80
Ohio	7	6	12	10	16	22	31	21	4	4	13	0	145
Oklahoma	2	3	6	8	13	13	8	9	4	5	2	2	75
Oregon	1	0	2	3	12	14	4	12	9	2	6	5	70
Pennsylvania	1	2	8	13	17	19	26	21	11	4	6	0	128
Rhode Island	0	0	0	1	3	4	3	4	2	0	1	0	18
South Carolina	0	9	22	9	19	29	24	24	11	3	2	3	155
South Dakota	0	0	4	6	12	23	24	19	13	5	0	0	106
Tennessee	3	10	20	15	14	23	27	26	8	4	7	2	159
Texas	6	9	17	18	20	11	18	22	12	10	4	4	151
Utah	0	1	2	6	18	11	17	17	23	12	1	2	110
Vermont	0	0	1	1	7	9	20	13	3	3	0	0	57
Virginia	0	10	10	6	16	14	23	19	4	0	2	1	105
Washington	0	1	2	2	7	13	4	11	9	2	4	3	58
West Virginia	0	6	6	3	9	17	26	17	5	0	4	1	94
Wisconsin	1	0	6	8	12	22	25	16	12	11	1	2	116
Wyoming	0	0	1	2	16	20	22	22	5	2	1	0	91

TABLE VIII.—*Total number of reports of auroras during* 1897.

State.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Alabama	0	0	0	0	0	0	0	0	0	0	0	0	0
Arizona	0	0	0	0	0	0	0	0	0	1	0	0	1
Arkansas	0	0	0	0	0	0	0	0	0	0	0	0	0
California	0	0	0	0	0	0	0	2	0	0	0	0	2
Colorado	2	0	3	0	2	0	0	0	0	0	0	1	8
Connecticut	0	0	1	4	1	0	1	0	1	2	1	2	13
Delaware	0	0	0	1	2	2	0	0	1	0	0	0	6
Dist. of Columbia	0	0	0	0	0	0	0	0	0	0	0	0	0
Florida	0	0	0	0	0	0	0	0	0	0	0	0	0
Georgia	0	0	0	0	0	0	0	0	0	0	0	0	0
Idaho	1	0	0	1	1	2	1	1	1	0	0	0	8
Illinois	3	6	3	7	6	6	7	6	5	3	1	11	64
Indiana	0	0	0	1	2	0	1	0	0	1	2	0	7
Indian Territory	0	0	0	0	0	0	0	0	0	0	0	0	0
Iowa	2	4	5	1	0	3	11	6	3	1	1	7	44
Kansas	0	7	0	4	2	0	2	0	0	4	5	4	28
Kentucky	0	0	0	0	0	0	0	0	0	0	0	0	0
Louisiana	0	0	0	0	0	0	0	0	0	0	0	0	0
Maine	9	10	17	12	1	0	2	3	2	19	4	6	85
Maryland	1	0	2	4	1	0	0	0	2	0	1	1	12
Massachusetts	8	5	5	7	2	1	5	3	0	2	0	5	43
Michigan	0	15	16	27	7	1	22	4	2	3	2	4	103
Minnesota	6	8	9	23	8	4	3	9	1	8	2	20	101
Mississippi	0	0	1	0	0	0	0	0	0	0	0	0	1
Missouri	3	0	0	1	0	3	2	0	1	0	2	0	12
Montana	12	6	11	5	8	3	2	6	6	20	6	20	105
Nebraska	3	0	1	6	4	2	8	0	0	0	0	4	28
Nevada	0	2	0	0	0	0	0	0	0	0	7	8	17
New Hampshire	8	6	16	18	6	6	2	0	0	15	5	7	89
New Jersey	1	2	1	3	2	2	1	0	2	0	0	0	14
New Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0
New York	12	4	13	26	0	3	7	3	0	11	3	4	86
North Carolina	0	0	0	0	0	0	0	0	0	0	0	0	0
North Dakota	17	31	48	35	15	5	2	19	10	25	8	10	225
Ohio	1	7	0	18	4	6	17	10	3	2	6	5	79
Oklahoma	0	0	3	0	0	3	0	0	0	0	0	0	6
Oregon	0	0	0	0	3	0	0	0	0	1	0	0	4
Pennsylvania	0	1	5	8	0	0	0	0	0	2	1	2	19
Rhode Island	0	1	1	0	0	0	0	0	0	0	0	0	2
South Carolina	0	1	0	0	0	0	0	0	0	0	0	0	1
South Dakota	11	9	5	7	3	2	6	1	0	10	3	10	67
Tennessee	1	0	1	0	0	0	1	0	0	0	0	0	3
Texas	0	0	0	0	0	0	0	0	0	0	0	0	0
Utah	0	0	0	1	0	0	0	0	0	0	0	0	1
Vermont	8	5	5	9	1	2	1	1	2	9	1	3	47
Virginia	0	0	0	0	0	0	0	0	0	0	0	0	0
Washington	0	6	8	15	3	0	3	0	1	0	0	0	36
West Virginia	0	0	0	0	1	0	0	0	0	0	0	0	1
Wisconsin	2	10	19	13	8	0	19	8	9	6	2	9	105
Wyoming	0	1	1	0	0	0	0	0	0	1	0	2	5

TABLE IX.—*Total number of days on which auroras occurred.*

Alabama	0	0	0	0	0	0	0	0	0	0	0	0	0
Arizona	0	0	0	0	0	0	0	0	0	1	0	0	1
Arkansas	0	0	0	0	0	0	0	0	0	0	0	0	0
California	0	0	0	0	0	0	0	2	0	0	0	0	2
Colorado	2	0	3	0	2	0	0	0	0	0	0	1	8
Connecticut	0	0	1	2	1	0	1	0	1	2	1	1	10
Delaware	0	0	0	1	1	2	0	0	1	0	0	0	5
Dist. of Columbia	0	0	0	0	0	0	0	0	0	0	0	0	0
Florida	0	0	0	0	0	0	0	0	0	0	0	0	0
Georgia	0	0	0	0	0	0	0	0	0	0	0	0	0
Idaho	1	0	0	1	1	2	1	1	1	0	0	0	8
Illinois	3	4	2	4	6	6	4	6	5	3	1	8	52
Indiana	0	0	0	1	2	0	1	0	0	1	2	0	7
Indian Territory	0	0	0	0	0	0	0	0	0	0	0	0	0
Iowa	2	1	3	1	0	3	5	2	2	1	1	2	23
Kansas	0	7	0	4	2	0	1	0	0	4	5	4	27
Kentucky	0	0	0	0	0	0	0	0	0	0	0	0	0
Louisiana	0	0	0	0	0	0	0	0	0	0	0	0	0
Maine	3	5	5	8	1	0	1	2	2	7	4	2	40
Maryland	1	0	2	4	1	0	0	0	2	0	1	1	12
Massachusetts	2	2	2	2	1	1	3	2	0	2	0	2	19
Michigan	0	6	11	9	3	1	6	4	1	2	2	2	47
Minnesota	3	4	3	13	6	4	2	8	1	4	2	7	57
Mississippi	0	0	1	0	0	0	0	0	0	0	0	0	0
Missouri	2	0	0	1	0	3	2	0	1	0	2	0	11
Montana	7	6	10	4	6	3	1	6	6	10	6	16	81
Nebraska	2	0	1	4	2	2	3	0	0	0	0	1	15
Nevada	0	2	0	0	0	0	0	0	0	0	5	8	15
New Hampshire	4	4	7	6	5	3	1	0	0	4	3	3	40
New Jersey	1	2	1	2	2	2	1	0	2	0	0	0	13
New Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0
New York	7	3	5	7	0	3	5	3	0	8	3	2	46
North Carolina	0	0	0	0	0	0	0	0	0	0	0	0	0
North Dakota	6	7	15	20	10	5	2	11	10	8	8	7	109
Ohio	1	7	0	10	2	6	6	9	3	2	5	5	56
Oklahoma	0	0	3	0	0	3	0	0	0	0	0	0	6
Oregon	0	0	0	3	0	0	0	0	0	1	0	0	4
Pennsylvania	0	1	3	3	0	0	0	0	0	2	1	2	12
Rhode Island	0	1	1	0	0	0	0	0	0	0	0	0	2
South Carolina	0	1	0	0	0	0	0	0	0	0	0	0	1
South Dakota	7	7	5	4	3	2	3	1	0	6	3	7	48
Tennessee	1	0	1	0	0	0	1	0	0	0	0	0	3
Texas	0	0	0	0	0	0	0	0	0	0	0	0	0
Utah	0	0	0	1	0	0	0	0	0	0	0	0	1
Vermont	3	2	3	5	1	1	1	1	2	6	1	2	28
Virginia	0	0	0	0	0	0	0	0	0	0	0	0	0
Washington	0	2	8	10	3	0	1	0	1	0	0	0	25
West Virginia	0	0	0	0	1	0	0	0	0	0	0	0	1
Wisconsin	1	6	7	6	5	0	4	5	3	4	2	6	49
Wyoming	0	1	1	0	0	0	0	0	0	1	0	2	5

Chart I. Surface Temperature, Resultant Wind, and Reduced Barometer for 1897.

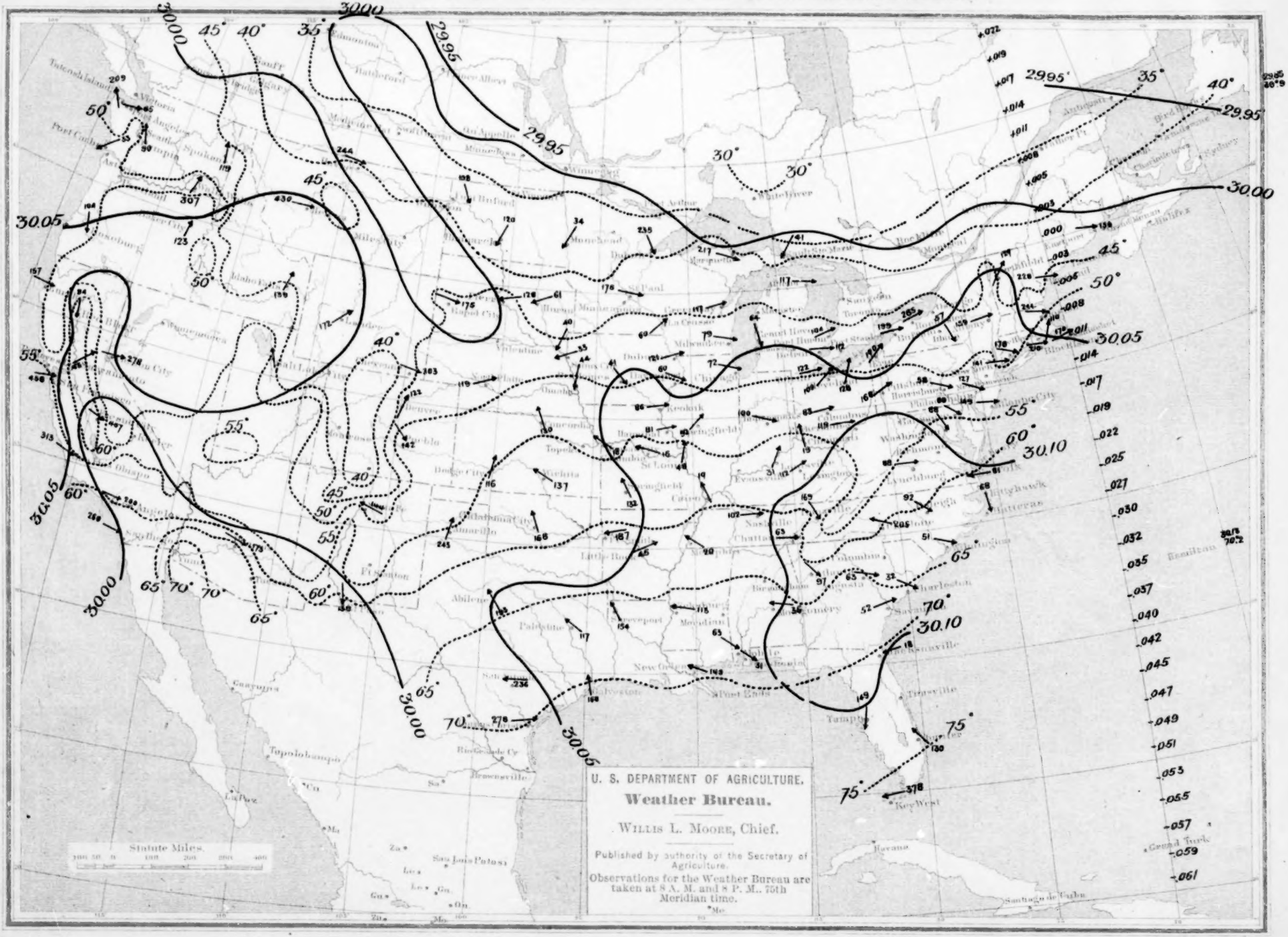


Chart II. Annual Maximum and Minimum Temperatures, 1897.

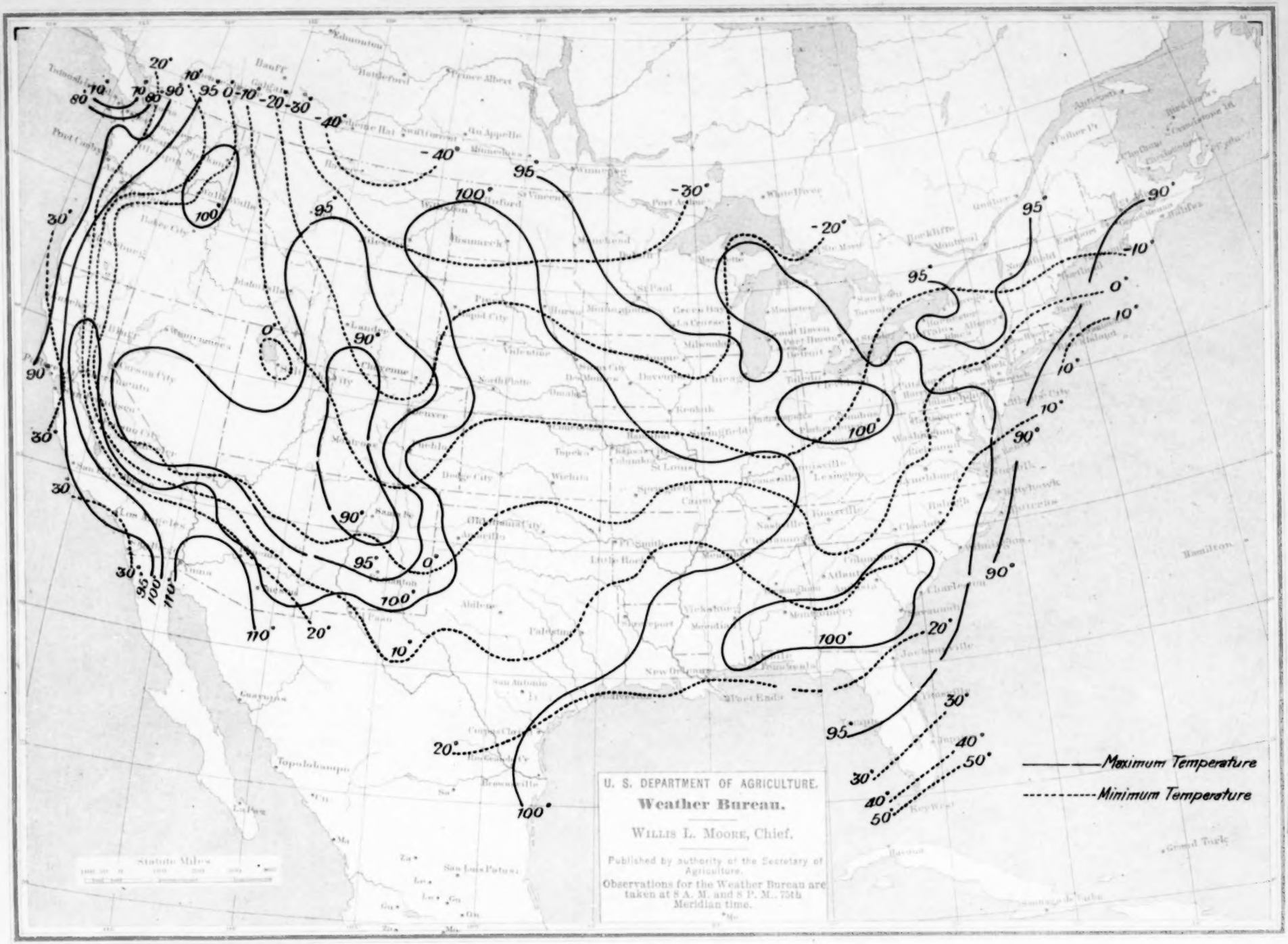


Chart III. Total Annual Precipitation, 1897.

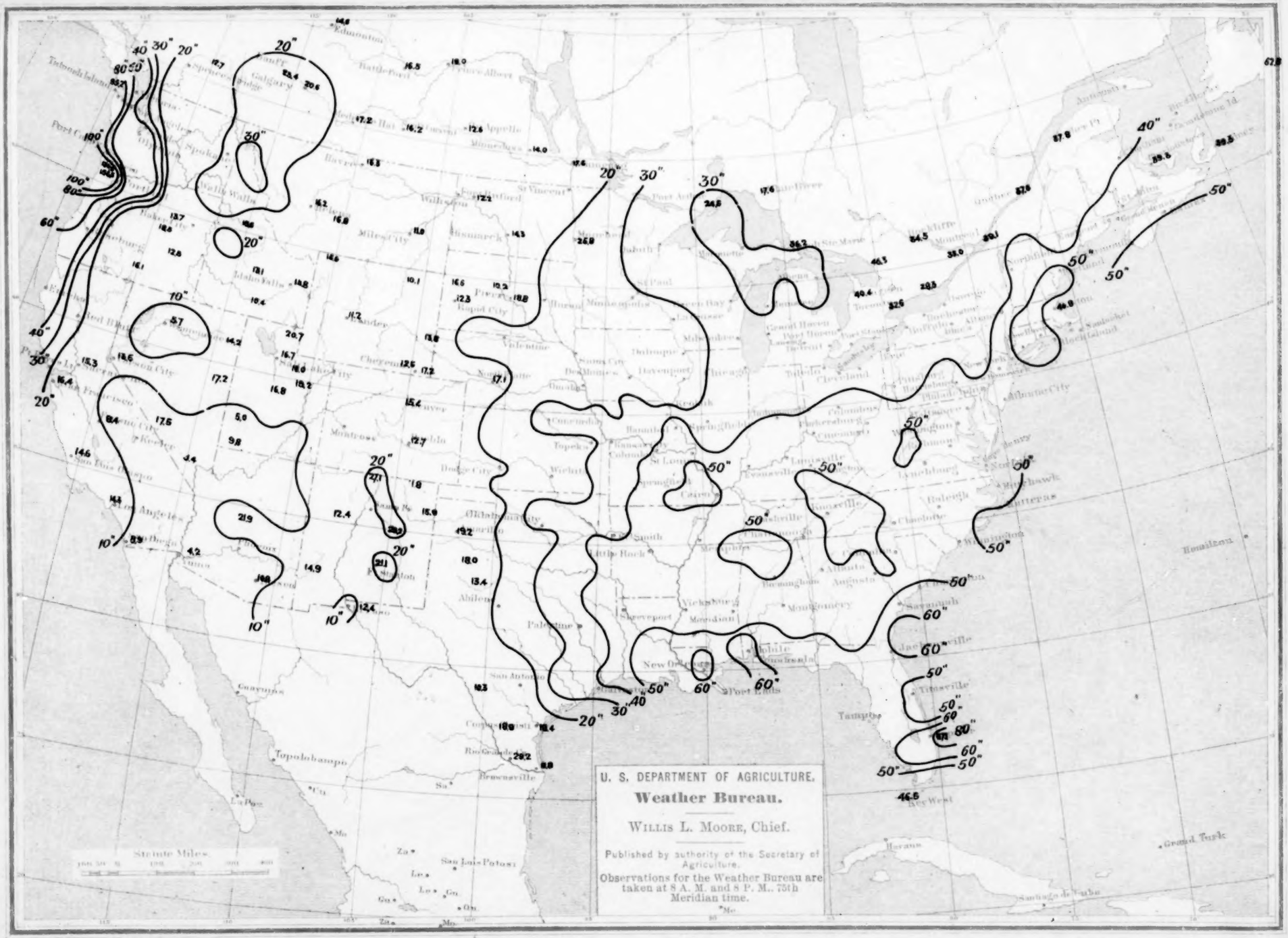


Chart IV. Sea-level Temperature and Pressure for 1897; by Park Morrill.

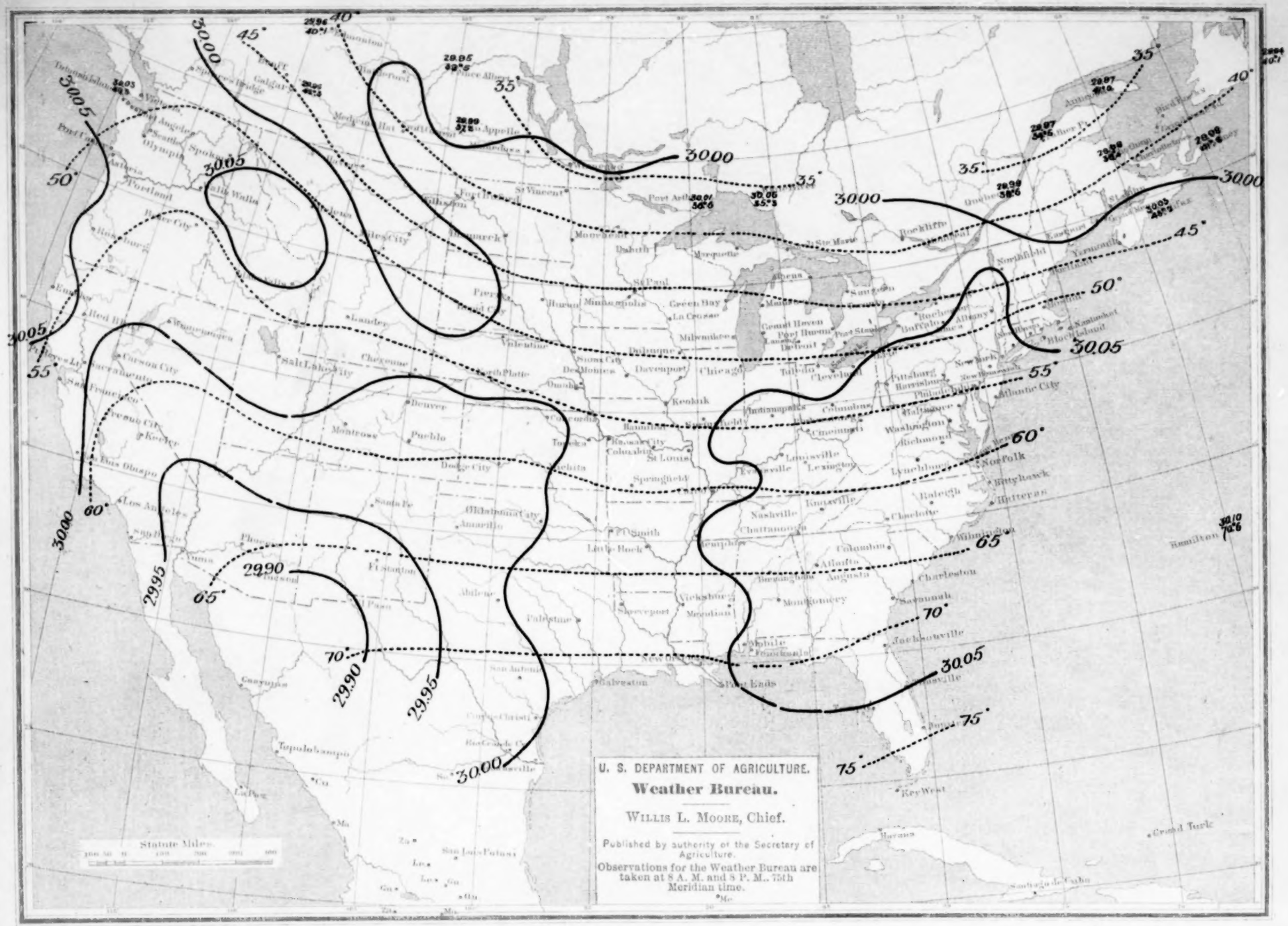
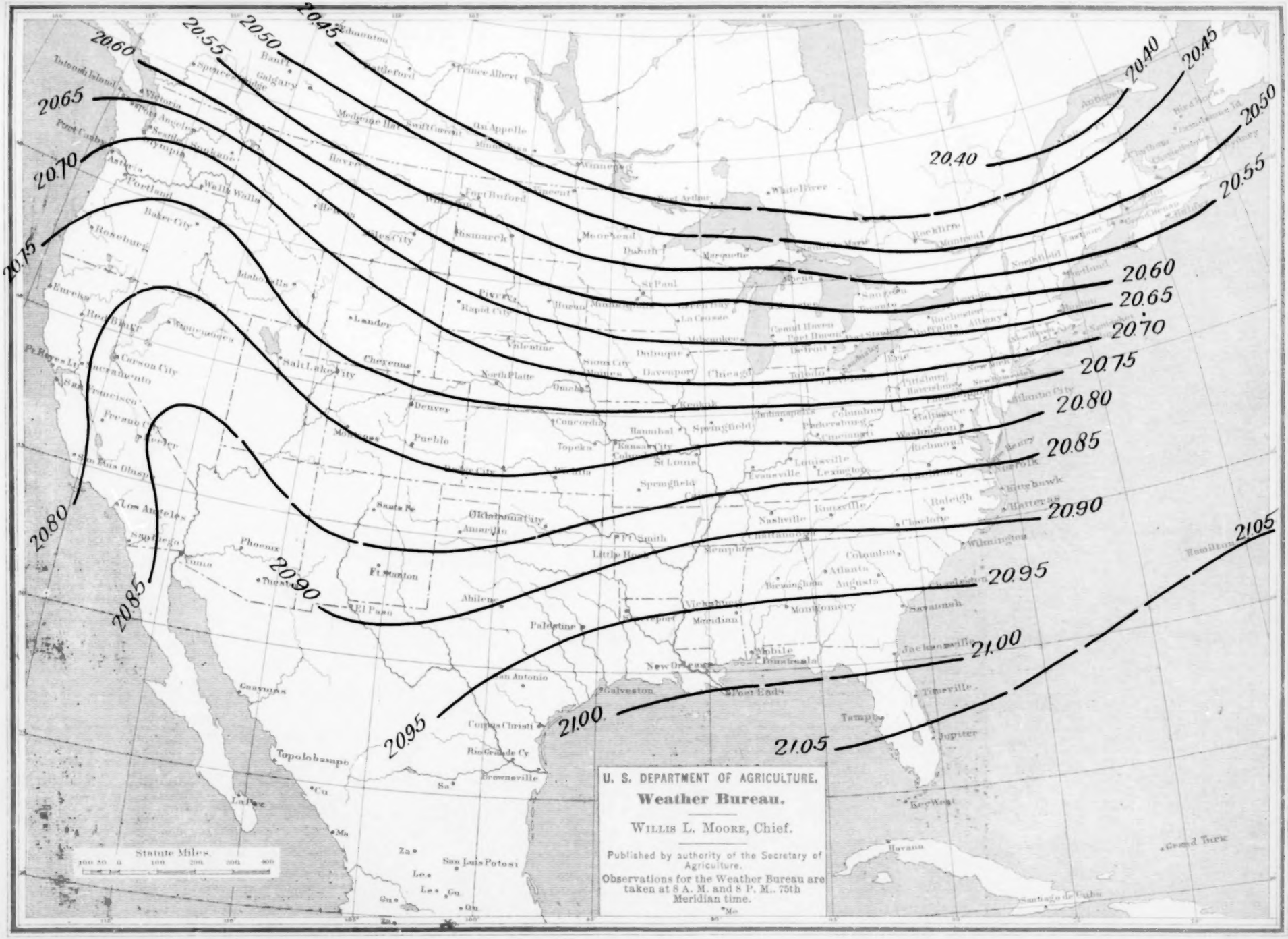


Chart V. High-level Pressure (10,000 feet) for 1897; by Park Morrill.

Chart V. High-level Pressure (10,000 feet) for 1897; by Park Morrill.



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